AD-A105 112 WILSON-HILL ASSOCIATES INC WASHINGTON DC F/G 1/5
COMMUTER AIRLINE FORECASTS,(U)
MAY 81 H MEDVILLE, C STARRY, G BERNSTEIN DOT-FA79WAI-138
UNCLASSIFIED FAA-APO-81-7 NL

1 OF 2
AD
A105112

Commuter Airline Forecasts

Prepared for:
Office of Aviation Policy and Plans

Hazel Medville - Wilson Hill Associates, Inc.
Claire Starry - SRI International
Gerald Bernstein - SRI International

Washington, D.C. 20591

FAA-APO-81-7
May 1981

15

LEVEL II

AD A105112

COMMUTER AIRLINE FORECASTS

FINAL REPORT

May 1981

Hazel Medville
Claire Starry
Gerald Bernstein

Prepared For:

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Office of Aviation Policy and Plans
Washington, D.C. 20591

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.

4. Title and Subtitle

Commuter Airline Forecasts

5. Report Date

May 1981

6. Performing Organization Code

APO-110

7. Author(s)

Hazel Medville, Claire Starry and Gerald Bernstein

8. Performing Organization Report No.

FAA-APO-81-7

9. Performing Organization Name and Address

Wilson Hill Associates, Inc.
1025 Vermont Avenue, N.W.
Washington, D.C. 20005

10. Work Unit No. (TRAIS)

11. Contract or Grant No.

DOT-FA79WAI-138

12. Sponsoring Agency Name and Address

Federal Aviation Administration
Office of Aviation Policy and Plans
800 Independence Avenue, S.W.
Washington, D.C. 20591

13. Type of Report and Period Covered

Forecast 1981-1992

14. Sponsoring Agency Code

FAA

15. Supplementary Notes

16. Abstract

This publication presents forecasts of commuter air carrier activity and describes the models designed for forecasting Conterminous United States, Puerto Rico and the Virgin Islands, Hawaii, and individual airport activity. These forecasts take into account the recent dynamic growth of the commuter industry and the effects of the changed operating and marketing environment created by the Airline Deregulation Act of 1978.

A separate forecast is provided for commuter cargo activity. Lastly, modeling approaches were evaluated to forecast activity at individual airports which the FAA expects to utilize in preparing its annual Terminal Area Forecast. Descriptions of the models are provided in the Appendices.

The models developed under this contract represents an initial effort by FAA to describe and Forecast a major sector of Aviation. It is anticipated that there will be further refinements to the models as the commuter industry evolves and additional data becomes available.

17. Key Words	18. Distribution Statement
Commuter Air Carrier, Commuter Cargo, Passenger Enplanements, Revenue Passenger Miles, Operations, Seat Miles	Document is available to the public through the National Technical Information Service, Springfield, Virginia 22151

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	109	

412146

Preface

The contents of this report reflect neither a position or an official policy of the Department of Transportation. This document is disseminated to the public in the interest of information exchange. The United States Government assumes no liability for the contents of this document or use thereof.

The work culminating in this report, Commuter Airlines Activity Forecasts, was performed under Department of Transportation contract number DOT-FA79WAI-138 with Wilson Hill Associates Inc., Washington, D.C. as the prime contractor and SRI International, Menlo Park, CA as the subcontractor.

The contract deliverables also included documentation of the data sources and files used in the development of the model which was delivered to FAA in November 1980 and a description of the computerized models for passenger commuter service delivered in May 1981. Interim reports, that were prepared during the development of the base data and the models for presentation at briefings, have been updated and incorporated where appropriate into this document.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (CONT'D.)

ACKNOWLEDGEMENTS

The Commuter Airlines Activity Forecasts were prepared for the Planning Analysis Division of the FAA Office of Aviation Policy and Plans by Hazel Medville of Wilson Hill Associates, Inc. and by Claire Starry and Gerald Bernstein of SRI International. Regina VanDuzee of the Aviation Activities Division, represented FAA as the technical officer on the project and contributed much from her knowledge of the commuter airline industry.

As part of the task force to produce reasonable long-term forecasts of this dynamic industry, a committee selected from airlines, manufacturers, trade associations, and local and Federal government reviewed and commented on the forecasting effort throughout the study. Individuals serving on the committee included:

Bar Harbor Airlines - Allyn J. Caruso and Jeff Jenner

Baltimore Washington International Airport - Jim Truby

Civil Aeronautics Board - Robin Caldwell, Bruce Goldberg, Paul Gavel, and Mary Vavrina

Commuter Airline Association of America - Steve Smith and Alan R. Stephen

The de Havilland Aircraft of Canada, Ltd - Joseph Gude and Arthur F. Toplis

Ransome Airlines - Larry Crawford

San Jose Municipal Airport - Raul Regalado

Scheduled Skyways, Inc. - Raymond A. Young III

S.M.B. Stage Line - Robert Grammer

Transportation Systems Center - Robert N. Tap

James Hines of Wilson Hill Associates and Marika Garskis of SRI International contributed to this report by collecting and computerizing the data base and forecast models and by evaluating

the data to assure continuity and accuracy. Gene Mercer of the FAA Office of Aviation Policy and Plans, Forecasting Branch provided guidance and support throughout the forecasting process.

Hazel Medville
Project Manager
Wilson Hill Associates

INTRODUCTION

This publication presents forecasts of commuter air carrier activity and describes the models designed for forecasting Conterminous United States, Puerto Rico and the Virgin Islands, Hawaii, and individual airport activity. As the forecasts were developed, the forecasting team relied heavily on advice of members of the Forecast Committee whose knowledge of the real world problems of operating a commuter airline, handling expanding commuter traffic at airports and producing aircraft for commuter airlines was an invaluable aid. These forecasts take into account the recent dynamic growth of the commuter industry and the effects of the changed operating and marketing environment created by the Airline Deregulation Act of 1978.

Computerized models were used to prepare forecasts of passenger enplanements and operations through 1992 for the 48 conterminous states, Hawaii and Puerto Rico/Virgin Islands. A forecast for Alaska is not included because the structure of the commuter industry there differs markedly from that of the other states. A separate forecast is provided for commuter cargo activity which depends heavily on information and insights obtained from a number of major commuter cargo carriers. Lastly, modeling approaches were evaluated to forecast activity at individual airports which the FAA expects to utilize in preparing its annual Terminal Area Forecast. Descriptions of the models are provided in the Appendices. If further information is desired concerning the structure and use of these models, interested persons can contact the Office of Aviation Policy and Plans, Forecasting Branch, Federal Aviation Administration.

CHAPTER 1. PASSENGER MODELS

BACKGROUND

Commuter airlines constitute a growing sector of the United States commercial passenger aviation industry. During a time when certificated route air carriers have shown modest annual growth, the commuter air carriers have shown a 47.7 percent gain in the number of passengers enplaned within the conterminous States (Continental United States) and a 16.2 percent gain in scheduled operations. This is impacting both the national air system and groundside handling of passengers, cargo, and aircraft. Service by these smaller aircraft at hub airports means more operations by a mixed fleet of aircraft which is adding to air traffic controllers workload. Due to the flexibility of these aircraft, service to non-FAA controlled airports has also increased, and with the increase, requests for sophisticated landing and takeoff systems to insure safe, timely, and non-weather dependent flights to cities and towns serviced by commuter airlines have also increased in number. At airports gate and terminal space shortages have occurred as carriers provide additional service with commuter aircraft and more frequently scheduled flights.

Commuter airlines were first required to register with the Civil Aeronautics Board (CAB) in 1969 and operated under CAB Economic Regulation Part 298. These airlines were defined as "operators which perform, pursuant to published schedules, five round trips per week between two or more points or carry mail." They were subject to limited regulatory and reporting requirements, were allowed free access to all markets and had no route protection. Under Part 298, the maximum size of commuter aircraft was first set at 12,500 pounds maximum takeoff weight and nineteen passenger capacity. This was later increased to a 7,500-pound payload with a maximum of 30 seats. The Airline Deregulation Act of 1978 permitted larger aircraft with the CAB regulation finally setting maximum capacity at 60 passengers.

Passage of the Deregulation Act accelerated the industry's growth because it (1) facilitated withdrawal of large certificated carriers from uneconomic short-haul routes, their commuter replacements offered frequent well-timed flights generating additional traffic, (2) permitted use of larger aircraft more attractive to the public and offering greater capacity, (3) made commuters eligible for the Equipment Loan Guarantee Program which aids them in the purchase of larger, improved aircraft, and (4) encouraged more joint fares and interline agreements with major carriers.

Before 1979, only two commuters, Air New England and Air Midwest, had become certificated carriers. The Deregulation Act made the certification process easier and less costly and the number of certificated commuters grew. These airlines either applied directly for certification or for certification on dormant routes no longer operated by the large carriers. A list of commuter carriers now wholly or partially certificated (dual authority) with their first Form 41 reporting dates is shown in Figure 1.

One of the first tasks of the working group (with the advice of the Forecast Committee) was to decide which carriers should be included in the forecast in order to properly describe the industry. The final decision was to include both part 298 and certificated passenger carriers utilizing aircraft seating 60 passengers or less and providing regularly scheduled service in accordance with published schedules. Cargo carriers included were those operating aircraft with a maximum payload of 18,000 pounds. These carriers typically have stage lengths of under 250 miles and serve as feeder lines to the trunk carriers with approximately 70 percent[1] of the passengers interlining in 1979.

1 Commuter Airline Association of America, Annual Report, November 1980, p. 6.

CARRIER NAME	1st Report on Form 41
Air Midwest	11/76
Air New England	1/75[1]
Air Wisconsin	7/79
Altair Airlines	1/79
Cochise	1/79
Golden West	2/79
Mississippi Valley	6/79
New Haven (New Air)	5/79
Sky West Aviation	7/79
Southeast	7/79
Swift Aire	1/79
Apollo	5/79
Big Sky	6/79
Empire	1/80
Imperial	12/79

1. 1st data month used in this study

FIGURE 1. CERTIFIED AIR ROUTE CARRIERS INCLUDED IN THE COMMUTER FORECAST

Past modeling efforts have produced models in which the growth of commuter activity was linked to air carrier activity.[2] Sufficient data have been collected during this project to permit the use of more sophisticated and improved modeling techniques. Forecast models of the commuter airline activity were developed for the conterminous United States (48 contiguous states and the District of Columbia), for the State of Hawaii, and for the U.S. Carribean areas, Puerto Rico and U.S. Virgin Islands. These latter two areas were considered significantly different from conterminous US to warrant separate analysis. A technical discussion of the models is provided in Appendix A.

CONTERMINOUS UNITED STATES

As indicated earlier, commuter activity has been increasing much faster than trunk and regional airline activity. Although this growth has not shown signs of tapering off, new market opportunities and the growth of per capita income will probably slow down, so that the growth in commuter activity will remain strong, but will not be as rapid as in the late 1970s. Market saturation, which will likely occur sometime after the forecast period, will eventually limit the rate of increase in commuter airline activity.

The generation of new origin destination pairs significantly influences the rate of growth in commuter enplanements and operations. The number of origin destination pairs increased about 15 percent per year during the late 1970s, and although many new market opportunities are expected to emerge in the 1980s, this growth rate is forecast to gradually taper off to an average of 8 percent to 9 percent per year during the 12-year forecast period, 1981 to 1992 as shown in Table 1.

---

2 See Systems Analysis and Research Corporation (SARC), "Forecasts of Commuter Airlines Activity," Report No. FAA-AVP-77-28 (July 1977) and "Update of Commuter Forecast Model," Final Report (May 1978).

Another important factor is general economic growth, as represented by constant dollar gross national product (GNP). As a rule air carrier traffic has grown faster than GNP, and commuter activity is no exception. Forecasts of constant dollar GNP growth in the 1980s were obtained from Wharton Econometric Forecasting Associates, Inc., and formed the basis for the scenario summarized in Table 2. Another scenario, based on lower GNP and origin-destination pair growth, was also examined.

Other independent variables included in the model are average seating capacity, fuel prices, automobile operating costs, average stage length, average distance per enplanement, and a variable to capture the effects of deregulation. The historical and average forecast growth rates for these variables are provided in Table 1; actual quarterly data and quarterly forecasts are shown in Appendix B.

The model forecasts seat miles, revenue passenger miles, operations, enplanements, and an inflation adjusted index of passenger fares charged. Definitions of these variables, as well as the independent variables used, are listed in Figure 2. The model results indicate continued rapid growth in commuter activity, although at rates below those experienced in the late 1970s (see Table 2). The ability of commuters to find new market niches will decline as market saturation occurs, but it appears complete market saturation will not occur during the forecast period. Changes in the regulatory environment or reduced assistance for essential air service may inhibit growth later in the 1980s. By the end of the 1980s and early 1990s, the rate of increase will be about half the rate recorded during the late 1970s, which started from a very small base. Actual enplanements are expected to reach at least 25 million by 1987 and more than 37 million in 1992.

TABLE 1. HISTORICAL AND FORECAST ANNUAL AVERAGE RATES OF GROWTH FOR CONTERMINOUS US MODEL INDEPENDENT VARIABLES

	PERCENT GROWTH		
		FORECASTED 1981-1992	
	ACTUAL 1975-1979	HIGH GROWTH SCENARIO[1]	LOW GROWTH SCENARIO[2]
Gross National Product (1972 dollars)	4.5	3.9	3.3
Origin-Destination City Pairs (O-D)	15.0	9.0	8.0
Average Seating Capacity	1.8	4.4	4.4
Fuel, in 1972 Cents Per Gallon	8.0	2.5	2.5
Index of Automobile Operating Costs Relative to General Inflation	3.1	0.1	0.1
Average Stage Length	n.a[3]	3.0	3.0
Average Distance Per Enplanement	2.8	2.1	2.1

1. GNP growth based on Wharton Econometrics Forecasting Associates, Inc; forecast dated March 1980.
2. GNP growth based on a more consecutive growth than the Wharton forecast prepared by Claire Starry, SRI International.
3. Average stage length between 1975 and 1979 was 106.7 miles. The lowest value was for 1978 second quarter (96.1 miles) and the highest values was for 1979 first quarter (115.2 miles).

DEPENDENT VARIABLES	DEFINITIONS/SOURCES
Passenger Enplanements	From Civil Aeronautics Board (CAB) Part 298 data and selected Form 41 data.
Revenue Passenger Miles	Calculated by multiplying enplaned passengers by distance flown. Data from CAB Part 298 and selected Form 41 data.
Operations	OAS scheduled flights multiplied by 2 to compute takeoffs and landing operations.
Seat Miles	Calculated using scheduled flights by aircraft type from the Official Airline Guide (OAG) computer tapes multiplied by average segment (distance), also OAG data, and then by number of seats normally installed in the aircraft type.
Fare Index	Consumer Price Index on all airline fares (no separate one for commuters is available) divided by the index of general inflation. Data from Department of Labor, "Consumer Price Index," and Department of Commerce, "Survey of Current Business," various issues.
INDEPENDENT VARIABLES	
Origin-Destination Pairs	Sum of the number segments provided by each airline, from CAB Part 298 data.
Gross National Product	In constant 1972 dollars, from Department of Commerce, "Survey of Current Business."
Auto Operating Cost Index	Consumer Price Index for owner operated transportation, adjusted for general inflation. Data from Department of Labor, "Consumer Price Index."
Fuel Costs	Price for fuel paid by commuters, approximately equal to retail price per gallon of aviation gasoline (taxes not included) as reported in Department of Energy, "Monthly Energy Review," various issues.
Average Seating Capacity	Computed from mix of aircraft reported in OAG computer tapes weighted by scheduled flights.
Average Distance Flown	Mean trip length in miles per enplaned passenger, from CAB Part 298 data and selected Form 41 data.
Average Stage Length	Mean stage length per operation, from OAG computer tapes.
Seasonal Factors	Because quarterly data were used, seasonal adjustment factors were included in the model. The variable is equal to a 1 or 0.
Deregulation	A variable to capture the effects of deregulation, before second quarter 1978 the variable is a zero and from that date on it is equal to 1.

FIGURE 2. DEFINITIONS AND SOURCES OF VARIABLES USED IN CONTERMINOUS UNITED STATES MODEL

TABLE 2. HISTORICAL AND FORECAST ANNUAL AVERAGE RATES OF GROWTH FOR SELECTED CONTERMINOUS US COMMUTER AIRLINE ACTIVITY VARIABLES

	PERCENT GROWTH			
	ACTUAL	FORECAST		
	1975-1979	1981-1985	1986-1992	1981-1992
CONSENSUS SCENARIO				
Seat Miles	19.1	10.6	10.1	10.3
Revenue Passenger Miles	23.8	14.0	10.5	11.9
Operations	16.2	6.6	5.2	5.7
Passenger Enplanements	47.7	11.6	8.4	9.6
Fare Index	nil	0.7	1.6	1.2
HIGH GROWTH SCENARIO				
Available Seat Miles	19.1	11.2	10.6	10.8
Revenue Passenger Miles	23.8	15.3	10.9	12.7
Operations	16.2	7.5	5.6	6.1
Passenger Enplanements	47.7	12.8	8.8	10.4
Fare Index	nil	1.3	2.2	1.8

Even with a less optimistic scenario, the forecast rate of growth for commuter activity is higher than for the large certificated carriers. Under the consensus scenario, there are fewer new market opportunities available to the commuters, and slower growth in GNP limits the increase in air travel.

The inflation adjusted index of fares charged by commuters is expected to increase gradually. During the mid to late 1970s, fares increased at about the same rate as inflation. With higher fuel prices and expanded service areas, the average fare is forecast to increase about one to two percentage points above inflation.

Forecasts for the two scenarios are given in Tables 3 and 4. In the consensus growth scenario, revenue passenger miles and seat miles increased by about 330 percent between 1979 and 1992, while enplanements increase by about 235 percent and operations by about 150 percent. Longer distances flown by passengers and larger aircraft account for the differences. In the high growth scenario, seat miles and revenue passenger miles increase by over 350 percent between 1979 and 1992, enplanements by about 270 percent and operations by 170 percent. The average load factor increases from 51 percent in the late 1970s to 55 percent in the consensus growth and 57 percent in the high growth scenario by 1992. The fares charged are higher under the high growth scenario, reflecting the ability of the carriers to raise fares when demand is strong.

Table 3

ACTUAL AND FORECAST VALUES OF CONTERMINOUS US COMMUTER AIRLINE ACTIVITY, CONSENSUS SCENARIO

YEAR	SEAT MILES (in millions)	PASSENGER MILES (in millions)	PASSENGER ENPLANEMENTS (in millions)	COMMUTER OPERATIONS (in millions)
Actual:				
1975	1415.050	616.09	5.26	2.036
1976	1482.779	674.90	5.83	2.214
1977	1668.369	841.32	7.05	2.531
1978	1913.835	1031.09	8.55	2.812
1979	2843.252	1447.06	11.04	3.677
Forecast:				
1981	3863.7	1803.25	13.50	4.843
1982	4328.9	2101.44	15.36	5.228
1983	4778.0	2396.07	17.17	5.559
1984	5260.6	2713.66	19.01	5.903
1985	5788.2	3050.45	20.93	6.244
1986	6359.4	3421.30	22.92	6.615
1987	7013.6	3817.38	25.03	6.985
1988	7748.4	4239.24	27.26	7.354
1989	8562.5	4694.30	29.61	7.734
1990	9430.0	5171.75	32.02	8.114
1991	10382.6	5676.16	34.50	8.497
1992	11382.6	6217.55	37.11	8.890

Table 4

ACTUAL AND FORECAST VALUES OF CONTERMINOUS US COMMUTER AIRLINE ACTIVITY, HIGH GROWTH SCENARIO

YEAR	SEAT MILES (in millions)	PASSENGER MILES (in millions)	PASSENGER ENPLANEMENTS (in millions)	COMMUTER OPERATIONS (in millions)
Actual:				
1975	1415.05	616.09	5.26	2.036
1976	1482.78	674.90	5.83	2.214
1977	1668.37	841.32	7.05	2.531
1978	1913.84	1031.09	8.55	2.812
1979	2843.25	1447.06	11.04	3.677
Forecast:				
1981	3884.8	1819.97	13.63	
1982	4341.4	2123.98	15.53	
1983	4811.6	2445.67	17.53	
1984	5348.6	2812.89	19.70	
1985	5943.8	3213.89	22.05	
1986	6570.0	3651.49	24.46	
1987	7283.9	4117.10	26.99	
1988	8078.7	4596.32	29.55	
1989	8957.8	5106.49	32.21	
1990	9894.4	5635.58	34.88	
1991	10906.6	6191.64	37.63	
1992	12010.3	6788.63	40.52	

HAWAII AND PUERTO RICO/VIRGIN ISLANDS MODELS

The models developed for Hawaii and Puerto Rico/Virgin Islands are structured differently than the national model. Reasons for this difference include the structure of the 48-state market versus those of Hawaii and Puerto Rico/Virgin Islands and the lack of data available for these latter two areas. Over 70 percent of commuter passengers in Hawaii are state residents, and most of them are on business. Most tourists use the larger inter-island carriers, Aloha and Hawaiian Airlines. Because level land for airports is very scarce in Hawaii, the possibilities for the construction of new airports is limited. Growth will come primarily from increased business related travel and from local and tourist recreation or personal business related trips. Commuter aircraft used in Hawaii are small, about 4.5 seats per aircraft. However, the establishment of a new carrier operating 60-seat aircraft will raise the average substantially to about 24 in 1982.

Table 5 gives the historic and forecast growth rates of the independent variables used in the models. Disposable income (in constant dollars) is an important factor influencing enplanements in Hawaii. In general, disposable income will be growing faster than it did in the late 1970s, but will not increase as fast as for the United States as a whole. Average distances flown in Hawaii are short--about 85 to 90 miles. Because no new airports are being planned before 1992, it is likely that this variable will not change significantly in the forecast period.

Puerto Rico/Virgin Islands commuter activity experienced little growth during the period from 1975 to 1979. Tourism, which provides an important part of the region's commuter passengers, leveled off, and the construction of a new airport reduced the

TABLE 5. HISTORICAL AND FORECAST ANNUAL AVERAGE RATES OF GROWTH FOR HAWAII AND PUERTO RICO/VIRGIN ISLAND MODELS INDEPENDENT VARIABLES

	PERCENT GROWTH	
	ACTUAL 1975-1979	FORECAST 1981-1992
Hawaii		
Disposable Personal Income (1972 dollars)	2.2	2.5
Average Stage Length	2.0	0.6
Average Distance per Passenger	2.0	0.6
Average Size of Aircraft	-0.9	2.0
Puerto Rico/Virgin Islands		
Personal Income (1972 dollars)	4.8	3.5
Average Stage Length	0.2	nil
Average Distance per Passenger	0.2	nil
Average Size of Aircraft	-1.0	nil

*A new commuter carrier has started operations in Hawaii utilizing 60 passenger aircrafts. This should affect the average size of aircraft and the forecasts of operations, revenue passenger miles, and enplanements.

need for some short-haul traffic. As with Hawaii, the average distance flown in Puerto Rico/Virgin Islands is short, about 65 to 70 miles, but the average size of aircraft is about 15 seats. There does not appear to be any potential for adding new, longer haul markets.

Based on the assumed changes in the independent variables described above, forecasts of commuter activity in the two areas were developed. Summary growth rates are provided in Table 6. Seat miles in Hawaii are forecast to increase about 30 percent between 1981 and 1985 while passenger miles are forecast to increase 33 percent for the same period. This sudden spurt in traffic is the result of the start-up of a new commuter carrier operating 60-passenger YS-11s and offering fares substantially under the certificated carrier rate. After the carrier becomes fully established, growth is expected to level off during the last part of the decade. This pattern is a reversal of the one recorded during the late 1970s, when passenger miles increased twice as fast as seat miles. Enplanements will be growing somewhat slower than in the late 1970s, but still at 8 to 11 percent per year. Operations, which increased dramatically in the late 1970s as short trips to less traveled parts of Hawaii became prevalent, will increase rapidly as the new carrier adds aircraft and departures, but will stabilize after 1988.

The stagnant condition of commuter acitvity in Puerto Rico/Virgin Islands is forecasted to continue. Seat miles actually declined in the late 1970s, but are expected to increase between 1.5 percent and 2.0 percent per year. Passenger miles are forecast to grow slightly faster, as are enplanements. Operations should increase at a slightly slower rate than seat miles because of the addition of larger aircraft to the fleet in 1980. There does not appear to be reason for average segment length to change.

TABLE 6. HISTORICAL AND FORECAST ANNUAL AVERAGE RATES OF GROWTH FOR SELECTED COMMUTER AIRLINE ACTIVITY VARIABLES: HAWAII AND PUERTO RICO/VIRGIN ISLANDS

	PERCENT GROWTH			
	ACTUAL	FORECAST		
	1975-1979	1981-1985	1986-1992	1981-1992
Hawaii				
Seat Miles	9.8	30.5	4.2	13.8
Passenger Miles	19.6	33.6	3.9	14.7
Passenger Enplanements	18.0	33.7	3.7	14.6
Operations	23.5	16.4	6.6	10.4
Puerto Rico/Virgin Islands				
Seat Miles	-0.2	1.6	1.7	1.7
Passenger Miles	3.7	1.9	2.1	2.0
Passenger Enplanements	2.7	1.9	2.1	2.0
Operations	2.7	1.6	1.7	1.7

TABLE 7. ACTUAL AND FORECAST VALUES OF COMMUTER AIRLINE ACTIVITY FOR HAWAII (IN MILLIONS)

YEAR	SEAT MILES	PASSENGER MILES	PASSENGER ENPLANEMENTS	COMMUTER OPERATIONS
Actual				
1975	30.62	14.60	0.178	0.095
1976	36.13	18.59	0.220	0.113
1977	39.55	20.50	0.245	0.136
1978	44.21	28.23	0.349	0.200
1979	44.52	29.90	0.345	0.221
Forecast				
1981	128.63	74.45	0.864	0.253
1982	246.20	148.25	1.726	0.326
1983	290.06	180.68	2.103	0.373
1984	329.36	206.71	2.404	0.418
1985	374.35	236.97	2.757	0.464
1986	414.80	267.39	3.108	0.510
1987	425.29	294.60	3.422	0.544
1988	477.20	316.55	3.673	0.596
1989	489.02	322.53	3.736	0.633
1990	503.81	326.79	3.778	0.670
1991	517.22	331.24	3.822	0.709
1992	531.39	335.84	3.867	0.750

TABLE 8. ACTUAL AND FORECAST VALUES OF COMMUTER AIRLINE ACTIVITY FOR PUERTO RICO/VIRGIN ISLANDS (IN MILLIONS)

YEAR	SEAT MILES	PASSENGER MILES	PASSENGER ENPLANEMENTS	COMMUTER OPERATIONS
Actual				
1975	168.35	82.36	1.284	0.254
1976	162.69	78.45	1.200	0.244
1977	157.64	78.88	1.185	0.242
1978	146.54	83.57	1.239	0.266
1979	166.80	95.26	1.428	0.283
Forecast				
1981	165.18	90.56	1.372	0.275
1982	167.70	92.22	1.397	0.279
1983	170.32	93.95	1.424	0.284
1984	173.02	95.74	1.451	0.288
1985	175.82	97.59	1.479	0.293
1986	178.81	99.50	1.508	0.298
1987	181.71	101.48	1.538	0.301
1988	184.81	103.53	1.569	0.308
1989	188.04	105.66	1.601	0.313
1990	191.36	107.86	1.634	0.319
1991	194.80	110.13	1.669	0.325
1992	198.37	112.49	1.704	0.330

Actual forecasts are presented in Table 7 for Hawaii and Table 8 for Puerto Rico/Virgin Islands; the quarterly forecasts are shown in Appendix B. Forecasts of average fares were not developed because data were not available. Total percentage increases in commuter activity in Hawaii are similar to those forecast for the 48 states. Puerto Rico/Virgin Island commuter activity is forecast to grow under 20 percent over the 12-year forecast period.

Adjustments were made to the model forecast for Hawaii to show the expected effect of Mid-Pacific Airlines entering the commuter airline market with 60-seat YS-11's in spring of 1981. The airline is expected to attract passengers from the trunk carriers. By 1988 their options on eleven aircraft should be fulfilled and the growth in passengers should level off. Table 8-A reflects our assumptions of Mid-Pacific Airlines' effect on commuter airline activity in Hawaii.

TABLE 8A. ESTIMATED EFFECT OF NEW COMMUTER CARRIER ON COMMUTER AIRLINE ACTIVITY FOR HAWAII (IN MILLIONS)*

YEAR	SEAT MILES	PASSENGER MILES	PASSENGER ENPLANEMENTS	COMMUTER OPERATIONS
Actual				
1975	30.62	14.60	0.178	0.095
1976	36.13	18.59	0.220	0.113
1977	39.55	20.50	0.245	0.136
1978	44.21	28.23	0.349	0.200
1979	44.52	29.90	0.345	0.221
Forecast				
1981	138.00	89.73	1.035	.279
1982	257.18	164.38	1.905	.337
1983	309.76	198.87	2.304	.382
1984	343.89	227.01	2.627	.427
1985	390.83	259.39	3.000	.473
1986	433.35	292.04	3.376	.520
1987	446.04	321.60	3.714	.561
1988	500.29	345.93	3.989	.612
1989	514.53	354.41	4.077	.656
1990	532.48	361.30	4.145	.700
1991	548.70	368.44	4.216	.746
1992	565.84	375.82	4.288	.794

* MID PACIFIC AIRLINES ENTERED THE HAWAIIAN COMMUTER MARKET WITH YS-11, 60 passenger aircraft in spring 1981.

CHAPTER 2: CARGO MODEL

All-cargo commuter activity has also experienced record growth during the past several years. The use of overnight small package delivery by commercial and manufacturing establishments has been augmented by the growth in the service and financial sectors, the more widespread use of high technology products, and more effective inventory control. Commuter airlines have responded to this market opportunity by increasing their common carrier and contract operations.

Future opportunities for commuters are good. The growth areas of the economy are those that tend to support the use of air freight and overnight deliveries, but the poor facilities available to all-cargo commuters at many airports may limit growth. A lack of sufficient facilities has reduced these operations at many airports, while other airports that have provided adequate space have attracted considerable growth in all-cargo operations. A second growth-limiting factor is the greater use of trucking operations for many short haul market pairs. Deregulation of air and truck services allows for more flexibility in intermodal operations that may result in the demise of air service for some of the routes easily and efficiently served by trucks. Routes where trucks are able to provide overnight service are most likely to show declines. Other routes, longer and more heavily used, should continue to experience substantial growth.

Aircraft used by all-cargo carriers will increase in size, at rates higher than for the passenger carriers. In a survey of some of the major commuter cargo airlines, many reported planned retirement of their aircraft in the 3000-pound payload range with replacement by larger aircraft with payload capacities of up to 18000 pounds or even larger jet aircraft. The use of

larger aircraft implies that operations will not increase, or increase slowly, even though cargo carried is forecast to increase substantially.

Forecasts developed for pounds of cargo carried by all commuter airlines are shown in Table 10. Because of data limitations, it was not feasible to identify cargo carried by all-cargo carriers, excluding Federal Express, as was the specification for this study. For the years 1975 to 1977 these data were collected and are given in Table 9. For the three years available, pounds of cargo carried by all-cargo airlines excluding Federal Express accounted for about 52 percent to 53 percent of the total for all cargo carriers. All-cargo operators indicated that this percentage share should remain at or exceed the historic level because of the limited cargo carrying capacity of most passenger commuter operations. Growth in cargo carried by air freight forwarders, however, should exceed the growth in the other all-cargo commuter airlines. In general, the percent rate of increase in cargo carried by the all-cargo carriers (excluding major air freight forwarders) can be assumed to approximate that for cargo carried by all commuters.

A definite break in the upward trend of cargo pounds carried by commuters occurred in 1978. Pounds carried increased by 48 percent between 1977 and 1978, significantly in excess of the 30 percent per year average between 1970 and 1977 and 12 percent per year between 1978 and 1980. The large increase in 1979 is generally attributed to the impact of deregulation. The major impacts of deregulation are fairly well completed, and large jumps are not expected in the future.

Growth in cargo carried is forecast to increase about 6 percent to 8 percent per year to 1985 and then from about 4 percent to 7 percent per year between 1986 and 1992. (See Table 10.) Three

TABLE 9

CARGO CARRIED BY COMMUTER AIRLINES
(in thousands of pounds)

	Actual		Predicted		
			GNP-High Growth	GNP-Low Growth	Trend
1970	43,527		15,191	15,191	14,976
1971	51,203		46,006	46,006	48,476
1972	74,573		99,180	99,180	81,976
1973	92,963		157,043	157,043	115,475
1974	138,279		151,181	151,181	148,975
1975	169,203	(89,304)*	139,374	139,374	182,475
1976	216,811	(116,203)*	195,060	195,060	215,974
1977	271,242	(137,722)*	254,765	254,765	249,474
1978	401,638		433,730	433,730	425,380
1979	475,000		472,333	472,330	458,879
1980	500,000		470,575	470,575	492,379
1981			482,968	469,066	525,879
1982			511,690	486,066	559,378
1983			535,807	528,438	592,878
1984			592,162	567,208	626,378
1985			651,868	607,319	659,878
1986			704,623	649,021	693,377
1987			789,784	693,653	726,877
1988			816,915	740,295	760,377
1989			876,453	788,696	793,876
1990			938,168	838,687	827,376
1991			1,002,140	889,767	860,876
1992			1,068,630	942,941	894,370

Source: Historical data: Commuter Airline Association of America "1980 Annual Report, Commuter Airline Industry" Washington, D.C. (November 1980); forecasts generated by SRI International.

* Cargo carried by all-cargo operators and excluding Federal Express.

TABLE 10

HISTORICAL AND FORECAST ANNUAL AVERAGE GROWTH RATES
FOR POUNDS OF CARGO CARRIED BY COMMUTERS
(percent per year)

Pounds of Cargo Carried	Actual		Forecast	
	1970-1977	1978-1980	1981-1985	1986-1992
High growth GNP	29.9	11.6	7.8	7.2
Low growth GNP	29.9	11.6	6.7	6.4
Trend line	29.9	11.6	5.8	4.3

separate forecasts were developed; the first two relate cargo carried to GNP (in constant 1972 dollars) and the third is a trend extrapolation. The high and low GNP scenarios discussed in Chapter 1 were used to generate the cargo pound forecasts given in this section. The trend extrapolation equation provided a better fit between predicted and actual historic data, and also resulted in the lowest growth scenario. The more conservative forecasts, therefore, may be the more realistic ones. As indicated earlier, all-cargo operators are moving toward larger turboprop and even jet aircraft. The growth in size of aircraft in this segement of the industry will probably exceed that for the passenger oriented airlines. Average annual growth of 4 percent to 6 percent, with more rapid increases early in the forecast period, indicates that all-cargo operations will not grow significantly. This result is somewhat misleading, because growth will be strong in many of the busier airports, but will drop off significantly on routes where trucks can easily and effectively replace aircraft. Also, because the amount of cargo handled will increase significantly, about doubling in size over the forecast period, the storage and handling space at airports required by all-cargo commuters will likewise need to increase.

CHAPTER 3: LOCAL MODELS EVALUATION

Commuter enplanements at an airport are influenced by a variety of transportation and demographic factors unique to each community. Availability of alternate forms of travel--either certificated air service or the automobile--will influence a traveler's decision to take a commuter flight, as well as timing and routing of flights. Perceived levels of comfort and safety will also have an effect. The location of a major hub airport relative to the originating community will influence mode choice, as will the economic activity within that community.

To reduce the evaluation of demand at over 600 locations served by commuter carriers to manageable proportions, a sample approach was adopted in which six cities of varying size and service were selected and a five-year (1975-1979) history of their commuter service and traffic was examined in detail. These cities were:

Boston, Massachusetts (a large hub);
Indianapolis, Indiana (a medium hub);
Spokane, Washington (a medium/small hub);
Abilene, Texas, and
Lake Tahoe, California (towered nonhubs); and
Altoona, Pennsylvania (nontowered, nonhub).

Three types of models were evaluated; these included a local growth rate model, a model relating local to national growth, and a market (origin-destination) forecast model. Examples of the results from each approach are described separately; the conclusions are summarized in Table 11. Two of the approaches evaluated yielded fair to good statistical and intuitive descriptions of commuter activity of a city. The overall results, demonstrate that local commuter activity is dependent on an exceptionally diverse set of causal factors that will require

Table 11

COMPARISON OF LOCAL MODEL RESULTS

Type Model	Statistical Validity	Advantages	Disadvantages
Growth rate	Poor	. Ease of application to any location . Variables readily available or easy to forecast . Computationally simple	. Poor statistical results . Oversimplified . Fails to reflect adequately many causal relations . Applicable to previously served locations only
Local to national growth	Mixed, some good estimates	. Ease of application to any location . Variables are generally available or fore-castable	. Requires national commuter and certificated carrier enplanement models as prerequisite . Applicable to previously served locations only
Market forecast	Fair to good	. Replicates specific city-pair characteristics . Applicable to previously served and new locations . Independent of any other forecast	. Contains location specific dummy variables . Has to be incorporated in a larger program to be used nationally

further effort to identify and quantify before a definitive model can be developed. None of the models reported herein is considered complete at this stage. An increase in the number of sample cities would provide a broader base for testing alternative model formulations by size or hub-status.

Growth Rate Model

This technique measures the annual percentage increase in commuter enplanements at a community as a function of changes in community and air service characteristics. The variables used, their definition, and the results are indicated in Table 12. The rationale for this approach is that increased population, increased commuter frequency and changes in certificated carrier frequency and enplanements will affect commuter enplanements. The results in the table are typical of those obtained from this approach; introducing dummy variables to identify unexplained jumps or drops in traffic between quarters of a year improved results slightly. Tahoe and Altoona were eliminated from the data base due to data problems.

The signs of the coefficients are mixed; frequency effects are positive (as expected) with the year previous change exerting a strong influence. Population changes would be expected to show positive correlation, not negative. Certificated carrier frequency and enplanements would also, in most of these cities, be expected to show a positive influence. In Abilene, the relationship might be negative due to the effect of Texas International on Chaparral. Reestimating the model without Abilene did not change results significantly. None of the dependent variables is significant without a 90% confidence interval.

The strength of this approach is its apparent simplicity and ease of application in that all dependent variables are readily

Table 12

LOCAL GROWTH RATE MODEL

Dependent variable: annual enplanements (TRAF)

Independent variables:

Abbreviation	Description
POP	Population of locality in specified year
FRQ1	Number of commuter departures in the specified year
FRQ2	Number of commuter departures the year previous
CFRQ	Number of certificated carrier departures in the specified year
CENP	Number of certificated carrier enplanements in the specified year

How measured:

The percent change (positive or negative) in all variables is measured from the preceding year. These are indicated by the prefix "D" before the abbreviation.

Results:

Variable	Estimate	t-Ratio
Intercept	0.38	1.35
DPOP	-8.90	-0.43
DFRQ1	0.15	0.28
DFRQ2	0.47	0.74
DCFRQ	-0.03	-0.02
DCENP	-0.03	-0.02
	N=14	R^2=0.37

obtainable or capable of being estimated. It is, however, the least accurate of the model approaches evaluated.

<u>Local To National Growth Model</u>

The second forecast technique evaluates local changes in enplanements or operations in relation to national changes. Such a technique provides a local forecast by developing unique local growth factors that are derived from national growth. The relation between local growth and national growth in enplanements and operations was explored.

Table 13 summarizes the results. Both operations and enplanement growth forecasts were evaluated. Those for enplanement growth yielded better results.

Two enplanements (TRAF) forecasts are presented. The first of these, using all independent variables, obtains inconclusive results. Population change acts as a strong predictor, but the signs of disposable income and frequency are contrary to expectation. The expected sign of the certificated frequency coefficient is unclear as a positive value would be anticipated where feeder effects dominate (e.g., Boston and Spokane), but negative where competition is heavy (Tahoe, Abilene and Indianapolis). Attempting to group the cities by these criteria did achieve some improvements. The forecast model for the smaller cities (the second entry in Table 13) shows an acceptable predictor. The two variables--disposable income and certificated departure frequency--can be seen to act as good predictors of commuter enplanement growth. Additional effort at categorizing cities and developing a "family" of predictors is indicated. Forecasting local enplanement growth in relation to national enplanement increases has potential.

Table 13

LOCAL TO NATIONAL GROWTH MODEL

Dependent Variable(s): annual enplanements (TRAF) or operations (OPNS) at each locality.

Independent Variables:

Abbreviation	Description
POP	Population of each locality in the specific year
DISINC	Per capita disposable income
FRQ	Number of commuter departures annually (NTAKEOFFS is the equivalent national variable)
CFRQ	Number of certificated carrier departures performed annually at each locality (ACOPS is the equivalent national variable).
LD1	Local Dummy Variable for Altoona
LD2	Local Dummy Variable for Lake Tahoe
LD3	Local Dummy Variable for Abilene
LD4	Local Dummy Variable for Spokane
LD5	Local Dummy Variable for Indianapolis

How measured:

Each variable is expressed as the ratio between that variables percent change in the locality from the previous year to the equivalent national variables change between the same years. RC prefixes the variables to indicate the ratio of change.

Results: RCTRAF (all cities)

Variable	Estimate	t-Ratio
Intercept	9.05	0.84
RCPOP	14.07	4.88
RCDISINC	-3.82	-0.53
RCFRQ	-0.56	-0.69
RCCFRQ	-3.01	-10.12
	N=24	R^2=0.90

RCTRAF (Altoona, Lake Tahoe, Abilene and Indianapolis)

Intercept	-10.21	-0.40
RCDISINC	21.21	1.57
RCCFRQ	-3.14	-5.61
	N=16	R^2=0.77

Market Forecast Model

The third technique evaluated forecasts of the actual traffic volume for any origin-destination pair of cities as a function of their demographic characteristics, their distance, the availability of markets to alternate hub airports, and the level of air service provided. Information was compiled for markets between the six sample cities and other cities to which they are connected by commuter service.

Minimum criteria were established to select markets for the data base:

- o Service in the market had to be provided for at least two full, consecutive years by at least one carrier;
- o Service was not started during any of the sample years;
- o No unusual jump or drop in traffic (other than seasonal variations) occurs during any quarter of a year; and
- o A minimum of 1,000 annual passengers should travel in the market.

All Lake Tahoe markets were eliminated due to a very unstable commuter history. The results are summarized in Table 14. The city-pair traffic volumes are summarized in Appendix C.

The results are good statistically. Only the sign of ALT 2--which identifies better hub access in another market than the one modeled--is contrary to expectation. GDIST appears to be a good replacement for distance, avoiding the problem that traffic would increase with distance up to approximately 120 miles (positive correlation), then would decrease (negative correlation).

Table 14

MARKET FORECAST MODEL

Dependent variable: Annual traffic volume (TRAF) in a directional market (between a specified origin-destination pair of cities).

Independent variables:

Abbreviation	Description
POPO	SMSA or county population (if not SMSA) in which the nonhub or smaller hub airport ("origin") of a city-pair is located by year.
POPD	SMSA population in which the hub or larger hub airport ("destination") is located by year.
GDIST	A statistical value derived from the distance between cities. See Appendix C .
FRQ	The number of annual commuter departures from origin to destination.
CFRQ	The number of annual certificated carrier departures from origin to destination.
FRQPOPO, CFRQPOPO	The number of annual commuter and certificated departures divided by the annual origin population.
ALT1, ALT2	Dummy variables reflecting air access from the origin to hub airports other than the destination. See Appendix C .

How measured: Each variable is expressed as its numeric value for each year.

Results: TRAF

Variable	Estimate	t-Ratio
Intercept	-37,857.20	-5.71
POPD	9.55	10.94
GDIST	213,898.10	6.25
ALT1	-1,476.17	-0.67
ALT2	19,418.34	4.94
FRQPOPO	231.65	2.48
CFRQPOPO	-283.44	-1.82
	N=58	R^2=0.82

The results of this model suggest that a "family" of similar models could be developed by segmenting market types into district categories (e.g., large hub to large hub, nonhub to large hub, etc.). For the FAA to utilize this type of forecasting model, a comprehensive computer program would be needed in which all O-D volumes would be calculated, reversed to provide two-way traffic, then assembled by origin city to provide a forecast for each locality.

CHAPTER 4: HISTORIC DATA COLLECTED FOR MODEL DEVELOPMENT

Data collected for evaluation during the model development effort was extracted from the following sources:

- Civil Aeronautics Board Commuter Air Carrier Statistics - Online O & D (Part 298) data, 1975-1979 as extracted on tape by the National Archives and Record Service in July 1980
- Official Airlines Guide (OAG) data for March, June, September and December 1975-1979 as edited by FAA and stored on the OAG "Miles" data tapes
- Air Traffic Activity system data for FAA towered airports, summed to quarters, 1975-1979
- Aircraft descriptions keyed from data in tables printed in the OAG 1977-1979, from Jane's, and miscellaneous sources
- Civil Aeronautics Board, aircraft inventories, published annually in June, for 1975 through 1979
- The Computer Company (TCC) data based on the CAB form 41 data for the small certificated carriers considered as commuters in this study (See Figure 2).
- Base year and forecast variables for GNP, fare, other trans fuel, personal income, disposable personal income.

The OAG data, CAB Part 298 data, and Air Traffic Activity data were accumulated by geographic entity, year and quarter, and class of service.

The geographic entities used for accumulating the base data were:

US: The 48 conterminous states and the District of Columbia

HI: Hawaii

AK: Alaska

VI: US Virgin Islands

PR: Puerto Rico

IN: International (CAB only)

The US Virgin Islands and Puerto Rico were combined for forecasting purposes because of their proximity and similarities in their economies. Due to the nature of the airline industry in Alaska, it was felt that a separate study would be necessary to successfully forecast growth. The International category for the CAB data was accumulated to cross-reference the figures with the published past years' total traffic data. Individual airlines may update data after the publication of the detailed data in the CAB Commuter Air Carrier Traffic Statistics.

Flights and trip segments that originated or terminated in the same geographic entity were assigned to that area. The number of times a week that an OAG flight was scheduled was multiplied by 13 (the number of weeks in a quarter) and then by 2 to obtain scheduled operations. When a flight originated in one geographic entity and terminated in another, then the number of flights per week was only multiplied by the number of weeks in the quarter. CAB data was assigned based on the originating airport of the trip segment. All the small certificated carrier data was included in the US figures.

The CAB data was separated into two classes of service: cargo only and passenger service. The airline records for each trip segment were evaluated to determine if any passengers had been carried. Segments without passengers were coded as cargo-only.

The OAG data contains codes to indicate cargo only flights and three classes of air carriers: certificated, intrastate, and air taxi. The OAG air taxi class and the selected certificated carriers providing commuter service were grouped as commuters for this study. Some of the Allegheny commuter flights may have been missed because of inconsistencies in the OAG data record coding of these flights.

The Air Traffic Activity system operations are reported for FAA towered airports only. In this system commuters are counted as either air taxi or air carriers depending on their aircraft size and flight numbers. The air taxi operations include some commuter flights, carriers carrying only mail, and air taxi services. Table 15 lists the OAG scheduled flights and the FAA Air Traffic Activity figures for comparison. For operations historic data the OAG scheduled.

Available seats were based on the OAG scheduled flights and the minimum seating capacity of the aircraft as published in the OAG or found in other sources. Many of the OAG aircraft codes in 1975 and 1976 were not listed in the OAG aircraft codes tables. Judgmental determinations were used in equating the codes to aircraft codes used in Jane's or to other codes on the OAG list.

Seat miles as computed from the OAG scheduled flights and passenger miles from the CAB part 298 and TCC form 41 data were used to calculate load factors and appear in Table 16. These load factors were within the range suggested as profitable by commuter operators. The load factors tend to be lower than those of the large certificated carriers because of the greater number of multiple segment flights and the need to have seats available for passengers that board down line. The smaller aircraft must also be operated at lower load factors to reduce the need to turn away customers because of flights filled to 100% capacity.

TABLE 15

OAG SCHEDULED OPERATIONS AND OPERATIONS REPORTED BY FAA TOWERS

OBS	GEO_ENT	TYPE	YR	ATA_OPS	OAG_SCH	RATIO
1	AK	AC	75	91609	234546	2.56029
2	AK	AC	76	90114	221936	2.46284
3	AK	AC	77	80568	247598	3.07316
4	AK	AC	78	87989	188084	2.13759
5	AK	AC	79	102710	255125	2.48394
6	AK	CO	75	120876	38558	0.31899
7	AK	CO	76	122869	92612	0.75375
8	AK	CO	77	153158	81640	0.53304
9	AK	CO	78	142726	81224	0.56909
10	AK	CO	79	148871	106886	0.71798
11	HI	AC	75	200659	175487	0.87455
12	HI	AC	76	201346	176904	0.87861
13	HI	AC	77	215054	187135	0.87018
14	HI	AC	78	229748	214162	0.93216
15	HI	AC	79	240591	243334	1.01140
16	HI	CO	75	95090	162214	1.70590
17	HI	CO	76	112991	194792	1.72396
18	HI	CO	77	135674	223470	1.64711
19	HI	CO	78	199762	249678	1.24988
20	HI	CO	79	220537	238758	1.08262
21	PR	AC	75	53280	46436	0.87155
22	PR	AC	76	50761	46202	0.91019
23	PR	AC	77	48968	43147	0.88113
24	PR	AC	78	47088	46670	0.99112
25	PR	AC	79	48156	44109	0.91596
26	PR	CO	75	168222	208221	1.23778
27	PR	CO	76	158916	202228	1.27255
28	PR	CO	77	147030	189345	1.28780
29	PR	CO	78	144451	170924	1.18327
30	PR	CO	79	146206	181506	1.24144
31	US	AC	75	8864491	9583691	1.08113
32	US	AC	76	9149029	9810138	1.07226
33	US	AC	77	9522670	10073375	1.05783
34	US	AC	78	9779700	10843898	1.10882
35	US	AC	79	9863742	10964369	1.11158
36	US	CO	75	2282535	2291172	1.00378
37	US	CO	76	2440667	2634619	1.07947
38	US	CO	77	2880763	2976519	1.03324
39	US	CO	78	3247563	2982408	0.91835
40	US	CO	79	3823937	3950713	1.03315
41	VI	AC	75	12779	14352	1.12309
42	VI	AC	76	12487	14690	1.17642
43	VI	AC	77	10274	14534	1.41464
44	VI	AC	78	11775	25870	2.19703
45	VI	AC	79	12641	17992	1.42331
46	VI	CO	75	85684	122096	1.42496
47	VI	CO	76	85083	117546	1.38155
48	VI	CO	77	95345	128427	1.34697
49	VI	CO	78	121494	141167	1.16193
50	VI	CO	79	136476	151372	1.10915

TABLE 16

BOARDING AND LOAD FACTORS

Year	Available Seat Miles *	Revenue Passenger Miles *	Load Factor	Operations *	Enplanements *	Boarding Factor
1975	1415.05	616.09	.44	2.04	5.26	5.17
1976	1482.78	674.90	.46	2.21	5.83	5.27
1977	1668.37	841.32	.50	2.53	7.05	5.57
1978	1913.83	1031.09	.54	2.81	8.54	6.08
1979	2843.25	1447.06	.51	3.68	11.04	6.00

* in millions

Source: CAB and TCC: revenue passenger miles and enplanements
OAG: available seat miles, operations

Local model data was extracted for specific airports by origin and destination city pairs from the OAG data files, the CAB part 298 data file, and the A-AIMS (American Airlines Information Management System) data base. The data was accumulated by airline, class of service, and non-directional market for model development.

Quarterly data used by the Conterminous United States, Hawaii, and Virgin Islands/Puerto Rico models and the quarterly forecasts are listed in Appendix B.

APPENDIX A

DESCRIPTION AND SPECIFICATIONS OF ECONOMETRIC MODELS

CONTERMINOUS US MODEL

The amount of commuter airline activity in the United States is determined by the factors influencing both the supply of these services and the demand for them. The model developed in this study is based on simultaneous estimation of the supply and demand equations and is designed to produce forecasts of commuter airline passenger operations (OPS), passenger enplanements (PE), revenue passenger miles (RPM), and seat miles (SM).

The demand for commuter airline services or passenger enplanements is considered to be a function of the price of these services (FARE); constant dollar gross national product (GNP72); the price of competitive modes of transportation, primarily automobiles (AUTOPR); the number of origin-destination pairs served by commuters (O-D); the average distance flown by passengers (ADF); and a series of dummy variables representing seasonal factors (D1, D2, and D3) and the impacts of deregulation (DREG). This equation is specified in a general form in 1a. Definitions of variables are provided in Figure A-1.

$$PE = f_a\,(FARE,\ GNP72,\ AUTOPR,\ O\text{-}D,\ ADF\ D1, D2, D3,\ DREG) \tag{1a}$$

Revenue passenger miles are estimated by multiplying passenger enplanements by average distance flown, as specified in equation 1b.

$$RPM = PE \times SEGDIST \tag{1b}$$

The supply of commuter operations is generally considered to be a function of the fare received, fuel costs, other costs, the size and number of aircraft, and the same dummy variables representing seasonal variations and deregulation. The general form of the supply equation is given below.

$$OPS = g_a\,(FARE,\ FUELPR,\ OTHERPR,\ SIZE,\ FLEET\ D1, D2, D3,\ DREG) \tag{2a}$$

VARIABLE	DEFINITION
PE	Passenger enplanements per quarter -- Civil Aeronautics Board (CAB), Part 298, data on enplaned passengers and selected Form 41 data.
RPM	Revenue passenger miles per quarter -- CAB Part 298 data and selected Form 41 data developed by multiplying the sume of enplaned passengers times the average distance flown by passengers.
O-D	Sum of the number of trip segments provided by each airline -- CAB Part 298 data.
OPS	Scheduled operations per quarter -- derived from the OAG data tapes fields for scheduled days multiplied by weeks in a quarter multiplied by 2 (take off and landing operations).
SIZE	Average number of seats per operation -- data calculated from Office Airline Guide (OAG) computer tapes.
SM	Seat miles flown -- OAG derived data on flights reported times by aircraft type times seats for standard aircraft configuration times average stage length.
ADF	Mean trip length in miles per enplaned passenger -- CAB Part 298 data and selected Form 41 data.
AVESTAGE	Mean stage length per operation -- OAG derived data.
FUELPR	Price of fule to commuter airlines -- data from the Department of Energy, "Monthly Energy Review," on retail price per gallon of aviation gasoline fuel (taxes not included). Price adjusted for inflation by using GNP deflator.
FARE	Index of airline fares -- data from Department of Labor, "Consumer Price Index" and represent an index of fares charged by all domestic airlines. No index was available for commuter airlines only. Index adjusted for general inflation using GNP deflator.
GNP 72	Gross National Product, in constant 1972 dollars -- data from Department of Commerce, "Survey of Current Business."
AUTOPR	Index of the price of user-operated transportation -- data from Department of Labor, "Consumer Price Index," adjusted for general inflation by GNP deflator.
D1, D2, D3	Seasonal dummy variables for first, second and third quarters, respectively. (value = 1 or 0.)
DREG	Deregulation dummy variable, zero through 1978, first quarter and one thereafter. It is assumed some of the effects of deregulation started before the 1978 act took effect. (value = 1 or 0.)

QUARTERLY DATA COULD NOT BE OBTAINED FOR THE FOLLOWING VARIABLES:

OTHERPR	Index of non-fuel costs of operating commuter aircraft. The few observations obtained and Aviation Data Services, Inc. statistics for general aviation aircraft operating costs, indicates that this variable appeared to follows general inflation.
FLEET	Total fleet seats available, or capital stock. Annual estimates indicate relatively smooth growth in this variable.

FIGURE A-1. DEFINITIONS OF VARIABLES

Seat miles are calculated by multiplying the number of scheduled flights (OAG) for an aircraft type by average seating capacity of the aircraft by average stage length.

$$SM = AVESTAGE \times SIZE \times OPS/2 \qquad (2b)$$

Equilibrium conditions are met when supply and demand for these services are in balance, or that the airlines are achieving their desired load factors. Equation 3 specifies these conditions

$$PE = h_a\ (OPS) \qquad (3)$$

where h_a indicates the desired average number of passengers per operation.

Because of nonavailability of data, not all of the variables could be included in the model. No time series data on the costs of nonfuel inputs to providing commuter services (i.e., equipment, services, and personnel) were available and estimates of fleet size could be determined only on an annual basis. The few estimates of nonfuel costs of operating commuter airlines indicated that these costs tended to follow general inflation and, therefore, after they were adjusted for inflation, the impact of these costs on explaining changes in activity would be slight.

A linear form of equations 1a, 2a, and 3 was estimated, as shown in equations 4 through 6. This specification provided the best overall results.

$$\begin{aligned} PE = a_{10} &+ a_{11}\ FARE + a_{12}\ GNP + a_{13}\ AUTOPR \\ &+ a_{14}\ O\text{-}D + a_{15}\ D1 + a_{16}\ D2 + a_{17}\ D3 \\ &+ a_{18}\ DREG + u_{a1} \end{aligned} \qquad (4)$$

$$\begin{aligned} OPS = a_{20} &+ a_{21}\ FARE + a_{22}\ FUELPR + a_{23}\ SIZE \\ &+ a_{24}\ D1 + a_{25}\ D2 + a_{26}\ D3 + a_{27}\ DREG \\ &+ u_{a2} \end{aligned} \qquad (5)$$

$$PE = a_{31} \, OPS + u_{a3} \tag{6}$$

Several techniques can be used to econometrically estimate the above models. A reduced form procedure was selected becasue of the limited number of observations and the poor quality of the data on fares charged by commuter airlines. By using the price index for all airline fares, we are assuming that commuter airline fares follow the average pattern of all fares, which tends to be dominated by trunk and regional carriers. With reduced form procedures, the fare variable does not affect the forecasting equations for the other dependent variables.

Table A-1 presents the results of the econometric estimation for the national level model.

The results for all three equations are fairly good. Most of the non-dummy independent variables have significant t-statistics and the signs of the coefficients generally follow the expected patterns. GNP positively affects commuter enplanements and operations, but decreases fares; the cost of automobile transportation has a negative effect, indicating that as ground travel becomes more expensive, people tend to travel less. The fuel price index variable has a positive coefficient, because commuter airlines become more competitive in short haul markets when fuel prices are high. Average passenger distance has a slight positive effect on operations and essentially no effect on enplanements. This variable does have a significantly negative impact on fares (per mile), as would be expected.

The number of origin-destination pairs served is important in generating passenger enplanements, but also adds to the average fare charged. Size of aircraft is not significant in any of the equations. The impact of deregulation over and above that incorporated into the other independent variables is fairly small. Seasonal factors vary with equation.

TABLE A-1. ECONOMETRIC ESTIMATES FOR REDUCED FROM EQUATIONS CONTERMINOUS US MODEL

	OPERATIONS	PASSENGER ENPLANEMENTS	INDEX OF FARE
R^2	.9889	.9958	.8684
Constant	-1.5338 (-2.4)	-2.861 (-1.9)	173.08 (4.4)
GNP72	0.0006 (2.2)	0.0018 (3.0)	-0.02 (-1.1)
AUTOPR	-0.0005 (-0.2)	0.0018 (-3.4)	-0.02 (1.7)
FUELPR	0.0096 (1.9)	0.065 (5.4)	0.34 (1.1)
ADF	0.0096 (2.6)	-0.001 (-0.1)	-0.91 (-3.9)
O-D	0.0001 (0.5)	0.001 (3.3)	0.02 (2.5)
SIZE	-0.0067 (-0.2)	0.057 (0.8)	-1.08 (-0.6)
D1	-0.0186 (-1.0)	-0.085 (-0.8)	2.30 (2.0)
D2	0.004 (0.2)	0.064 (1.4)	-1.88 (-1.6)
D3	-0.0088 (-0.4)	0.218 (4.3)	-1.50 (-1.1)
DREG	0.0070 (0.2)	-0.082 (-0.9)	-2.63 (-1.1)

t-statistics given in parenthesis

HAWAII AND PUERTO RICO /VIRGIN ISLANDS MODELS

As indicated in the main body of the report, commuter activity in Hawaii and Puerto Rico/Virgin Islands is influenced by factors that are different from those that affect commuter airlines in the 48 states. The models developed to forecast commuter activity in these two areas reflect this difference and are structurally simpler because of less available data, as specified in equations 7 and 8.

$$PE = b_{10} + b_{11}\ \text{Income} + b_{12}\ D1 + b_{13}\ D2 + b_{14}\ D3 + v_1 \quad (7)$$

$$\begin{aligned} OPS = b_{20} + b_{21}\ PE + b_{23}\ SIZE &+ b_{24}\ D1 + b_{25}\ D2 \\ &+ b_{26}\ D3 + v_2 \end{aligned} \quad (8)$$

(Income denotes constant dollar disposable personal income for Hawaii and constant dollar personal income for Puerto Rico/Virgin Islands and v_1 and v_2 represent random error terms.) (Personal income data are used in place of GNP because the latter data are generally not available on a state level.)

The model was specified in the above fashion for Hawaii because, after discussions with local airlines, it was determined that most commuter passengers are business people. Therefore, enplanements are specified as a function of the income generated in the state. Operations are assumed to be a function of enplanements and the average size of aircraft. Because quarterly data are used, seasonal adjustment is accomplished through three dummy variables. Ordinarily, a price variable would be included in equations 7 and 8, but we were unable to find time series data on fares charged in Hawaii.

The same basic model structure is used for Puerto Rico and the Virgin Islands. Tourism, however, is a more important source of

commuter passengers in this area, but personal income is still used as the independent variable for enplanements because tourism expenditures help to generate personal income.

Results from model estimation for reduced form equation are provided in Table A-2. The Hawaii model gave better results than the Puerto Rico/Virgin Islands model. The seasonal adjustment and size of aircraft variables have the insignificant t-statistics, but there are very significant relationships between enplanements and income and operations and enplanements.

Table A-2

ECONOMETRIC ESTIMATES FOR REDUCED FORM
EQUATION: HAWAII AND PUERTO RICO/VIRGIN ISLANDS

	Hawaii		Puerto Rico/Virgin Islands	
	Enplanements	Operations	Enplanements	Operations
R2	.7993	.8991	.3904	.7693
Constant	-0.456 (-6.6)	0.0 (0.0)	0.143 (1.3)	0.006 (0.2)
Income*	0.125 (7.6)		0.008 (1.5)	
Enplanements		0.660 (10.9)		0.166 (5.8)
Size		-0.0012 (-0.2)		0.001 (0.3)
D1	0.0016 (0.3)	0.001 (0.3)	0.052 (0.0)	-0.004 (-1.4)
D2	0.0029 (0.5)	0.003 (-0.8)	0.003 (0.9)	-0.004 (-1.5)
D3	0.0043 (0.7)	-0.0004 (-0.1)	0.024 (0.3)	-0.005 (-1.9)

* Disposable personal income, 1972 dollars for Hawaii and personal income, 1972 dollars, for Puerto Rico

t-statistics given in parenthesis

Cargo Model

Because of data limitations, an all-cargo commuter airline model could not be developed. Instead, data on pounds of cargo carried by all commuters were used to estimate the overall growth in this variable. The resulting growth rate was used to approximate the rate of increase in pounds of cargo carried in all-cargo commuter operations. All-cargo operations (excluding Federal Express) accounted for about 52% to 53% of cargo carried by all commuters between 1975 and 1977 and, assuming this share remains relatively constant, the amount of cargo carried by the all-cargo operators can be calculated from the model forecasts.

Two econometric equations were specified, as shown below:

$$\text{POUNDS} = C_{10} + C_{11}\,\text{GNP72} + C_{12}\text{DREG} + w_1 \qquad (9a)$$

and

$$\text{POUNDS} = C_{20} + C_{21}\text{YEAR} + C_{22}\text{DREG} + w_2 \qquad (9b).$$

POUNDS denotes thousands of pounds of cargo carried by all commuters[1], YEAR is a trend variable where 1970=70, 1972=72, and so forth, and w_1 and w_2 are random error terms. GNP72 and DREG are defined in Table A-1.

The results from estimation are given in Table A-3. Both equations yielded good results; however, the second specification, given in equation 9b, gave a better fit. Both equations were used to generate the alternative forecasts provided in Chapter 2 of this report.

[1] Commuter Airline Association of America (CAAA), "1980 Annual Report, Commuter Airline Industry", Washington, D.C. (November 1980).

TABLE A-3

ECONOMETRIC ESTIMATES
FOR CARGO EQUATIONS

	R^2	Constant	GNP 72	Year	DREG
Pounds	.9676	-893,870 (-5.3)	837 (6.1)		124,367 (3.1)
Pounds	.9894	-2,330,000 (-10.8)		33,500 (11.4)	142,406 (6.8)

t-statistics given in parenthesis.

APPENDIX B

QUARTERLY DATA AND FORECASTS

DEFINITIONS

QUARTERLY FORECASTS AND BASE DATA - DEFINITIONS

ADF	the average distance flown by a commuter airline passenger
ATOPS	commuter operations
AVEDIST	the average stage length
AVESEATS	the average available seats per operation
DEREG	dummy variable used to take into account changes in growth since deregulation (0 before 2nd quarter 1978, 1 thereafter)
DUM1, DUM2, DUM3	dummy variables used to forecast seasonal fluctuations in the data (DUM1=1 if first quarter data; DUM2=1 if second quarter data; and DUM3=1 if third quarter data; DUM1, DUM2, and DUM3=0 for fourth quarter data)
FARE	a fare index for all air transportation (1972=100)
FUELAD	the cost per gallon of aviation fuel for commuter airlines in 72 constant dollars
GNP72	the GNP in 1972 constant dollars
NTAKEOFF	the number of commuter airline pairs weighted by airlines (CAB Part 298 data only)
OBS	a record number generated by the SAS procedure that sequences the data for printing
OTC	the consumer Price Index for owner operated transportation
PATOPS	forecasted commuter operations
PFARE	forecasted fare index
PRPTDIST	forecasted revenue passenger
PRPTI	forecasted enplanements
PSEATMI	forecasted available seat miles
QTR	the year and quarter of the data or forecast
RPTDIST	revenue passenger miles
RPTI	enplaned passengers
SEATMI	available seat miles

CONTERMINOUS UNITED STATES

NATLDATA-HISTORICAL AND ACTUAL NATIONAL DATA FILE
ATOPS=0.91*OAG SVHEDULED OPS

OBS	QIR	FARE	,' OTC	GNP72	FUELAD	NTAKEOFF	ADF	RPTDIST	RPT1	ATOPS	DUM1	DUM2	DUM3	DEREG	AVESEATS	AVEDIST	SEATMI
1	751	95.28	97.64	1169.8	32.1	1576	118.213	141.562	1.19752	0.502801	1	0	0	0	12.4520	98.942	326.022
2	752	94.01	99.19	1188.2	32.2	1600	116.843	152.956	1.30907	0.490517	0	1	0	0	12.5266	110.084	356.008
3	753	96.80	101.84	1220.7	31.1	1634	115.254	170.555	1.47982	0.509153	0	0	1	0	12.1513	110.040	358.317
4	754	95.57	102.06	1229.8	31.4	1667	118.201	151.019	1.27764	0.533248	0	0	0	0	12.2573	108.922	374.703
5	761	96.72	101.82	1255.5	31.9	1585	117.264	151.142	1.28891	0.531816	1	0	0	0	12.2814	109.860	377.656
6	762	97.12	104.05	1268.0	31.8	1705	115.243	169.944	1.47466	0.547389	0	1	0	0	12.0257	106.749	369.845
7	763	99.02	106.26	1276.5	33.3	1682	114.598	186.983	1.63164	0.557751	0	0	1	0	11.7864	106.968	370.102
8	764	100.07	106.54	1284.0	32.1	1737	115.978	166.834	1.43850	0.577412	0	0	0	0	11.7325	102.419	365.176
9	771	98.64	106.24	1315.7	33.0	1713	118.742	178.052	1.49949	0.556343	1	0	0	0	12.0869	104.907	371.284
10	772	98.40	107.37	1331.2	33.8	1933	116.273	204.056	1.75497	0.644299	0	1	0	0	11.8695	105.794	425.822
11	773	97.47	106.42	1353.9	34.4	1982	120.849	237.553	1.96570	0.665959	0	0	1	0	11.3460	102.889	409.173
12	774	97.67	104.78	1361.3	33.2	1981	120.879	221.659	1.83373	0.664393	0	0	0	0	12.0532	109.636	462.090
13	781	100.47	104.81	1367.8	33.6	2018	121.338	228.494	1.88312	0.670160	1	0	0	0	12.4742	97.030	426.916
14	782	97.60	103.10	1395.2	35.0	2176	120.880	262.879	2.17471	0.712879	0	1	0	1	12.6749	96.163	457.312
15	783	94.83	103.38	1407.3	35.2	2191	120.365	292.548	2.43052	0.697318	0	0	1	1	12.6587	96.336	447.562
16	784	93.07	103.97	1426.6	34.7	2028	120.163	247.165	2.05692	0.731737	0	0	0	1	13.1445	114.977	582.045
17	791	91.63	105.28	1430.6	35.5	2126	127.673	269.686	2.11232	0.808387	1	0	0	1	13.0223	115.215	638.348
18	792	90.75	108.27	1422.3	40.8	2449	131.730	373.994	2.83910	0.925830	0	1	0	1	13.0405	110.358	701.253
19	793	94.19	111.63	1433.3	47.2	2351	131.357	425.557	3.23971	0.962300	0	0	1	1	13.1560	111.007	739.659
20	794	99.16	127.55	1438.4	48.8	2411	132.780	377.819	2.84554	0.980886	0	0	0	1	13.5221	109.441	763.992

NATLDATA-HISTORICAL AND ACTUAL NATIONAL DATA FILE
HIGH GROWTH

```
MODEL:    MODEL01              SSE      0.026908      F RATIO       214.18
                               DFE             9      PROB>F        0.0001
DEP VAR: RPT1                  MSE   0.002989735      R-SQUARE      0.9958
         SUMWGT OF DISTANCE

DURBIN-WATSON D STATISTIC    =   1.8287
FIRST ORDER AUTOCORRELATION =   0.0571
```

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T RATIO	PROB>|T|	VARIABLE LABEL
INTERCEPT	1	-2.860579	1.507999	-1.8969	0.0903	
FUELAD	1	0.064957	0.012009	5.4089	0.0004	
UTC	1	-0.019254	0.005707225	-3.3735	0.0082	
AVESEATS	1	0.056713	0.067863	0.8357	0.4249	MEAN OF MINSEATS
ADF	1	-0.00103343	0.008940753	-0.1156	0.9105	MEAN OF DISTANCE
GNP72	1	0.001752865	0.0005748655	3.0492	0.0138	
NTAKEOFF	1	0.0008106179	0.0002430889	3.3347	0.0087	N OF DISTANCE
DUM1	1	-0.035095	0.043237	-0.8117	0.4379	
DUM2	1	0.063637	0.044997	1.4142	0.1909	
DUM3	1	0.218331	0.051239	4.2610	0.0021	
DEREG	1	-0.082423	0.088502	-0.9313	0.3760	

NATLDATA-HISTORICAL AND ACTUAL NATIONAL DATA FILE
LOW GROWTH(CONCENSUS)

MODEL:	MODEL01	SSE	0.026908	F RATIO	214.18
		DFE	9	PROB>F	0.0001
DEP VAR:	RPT1 SUMWGT OF DISTANCE	MSE	0.002989735	R-SQUARE	0.9958

DURBIN-WATSON D STATISTIC = 1.8287
FIRST ORDER AUTOCORRELATION = 0.0571

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T RATIO	PROB>|T|	VARIABLE LABEL
INTERCEPT	1	-2.860579	1.507999	-1.8969	0.0903	
FUELAD	1	0.064957	0.012009	5.4089	0.0004	
OTC	1	-0.019254	0.005707225	-3.3735	0.0082	
AVESEATS	1	0.056713	0.067863	0.8357	0.4249	MEAN OF MINSEATS
ADF	1	-0.00103343	0.008940753	-0.1156	0.9105	MEAN OF DISTANCE
GNP72	1	0.001752865	0.0005748655	3.0492	0.0138	
NTAKEOFF	1	0.0008106179	0.0002430889	3.3347	0.0087	N OF DISTANCE
DUM1	1	-0.035095	0.043237	-0.8117	0.4379	
DUM2	1	0.063637	0.044997	1.4142	0.1909	
DUM3	1	0.218331	0.051239	4.2610	0.0021	
DEREG	1	-0.082423	0.088502	-0.9313	0.3760	

NATLDATA-HISTORICAL AND ACTUAL NATIONAL DATA FILE
LOW GROWTH(CONCENSUS)

MODEL: MODEL01
DEP VAR: AIOPS FREQUENCY COUNT

SSE	0.00494542	F RATIO	80.25
DFE	9	PROB>F	0.0001
MSE	0.0005494911	R-SQUARE	0.9889

DURBIN-WATSON D STATISTIC = 2.5772
FIRST ORDER AUTOCORRELATION = -0.3073

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T RATIO	PROB>|T|	VARIABLE LABEL
INTERCEPT	1	-1.533821	0.646495	-2.3725	0.0417	
FUELAD	1	0.009601088	0.00514845	1.8649	0.0951	
OTC	1	-0.0005276	0.002446746	-0.2156	0.8341	
AVESEATS	1	-0.00670574	0.029093	-0.2305	0.8229	MEAN OF MINSEATS
ADF	1	0.00963445	0.003832993	2.5136	0.0331	MEAN OF DISTANCE
GNP72	1	0.0005532576	0.0002464508	2.2449	0.0514	
NTAKEOFF	1	.00005435436	0.0001042147	0.5216	0.6146	N OF DISTANCE
DUM1	1	-0.018601	0.018536	-1.0035	0.3418	
DUM2	1	0.004220508	0.019291	0.2188	0.8317	
DUM3	1	-0.00881159	0.021967	-0.4011	0.6977	
DEREG	1	0.006965297	0.037942	0.1836	0.8584	

NATLDATA-HISTORICAL AND ACTUAL NATIONAL DATA FILE
LOW GROWTH(CONCENSUS)

MODEL: MODEL01	SSE	18.326384	F RATIO	5.94
	DFE	9	PROB>F	0.0066
DEP VAR: FARE	MSE	2.036265	R-SQUARE	0.8684

DURBIN-WATSON D STATISTIC = 1.8092
FIRST ORDER AUTOCORRELATION = 0.0718

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T RATIO	PROB>|T|	VARIABLE LABEL
INTERCEPT	1	173.078484	39.355160	4.3979	0.0017	
FUELAD	1	0.339879	0.313410	1.0845	0.3064	
DTC	1	0.256943	0.148945	1.7251	0.1186	
AVESEATS	1	-1.082193	1.771049	-0.6110	0:5563	MEAN OF MINSEATS
ADF	1	-0.905735	0.233332	-3.8817	0.0037	MEAN OF DISTANCE
GNP72	1	-0.016768	0.015003	-1.1177	0.2927	
NTAKEOFF	1	0.015851	0.006344041	2.4985	0.0339	N OF DISTANCE
DUM1	1	2.301629	1.128392	2.0397	0.0718	
DUM2	1	-1.880268	1.174321	-1.6012	0.1438	
DUM3	1	-1.496402	1.337228	-1.1190	0.2921	
DEREG	1	-2.627398	2.309682	-1.1376	0.2847	

NATLDATA-HISTORICAL AND ACTUAL NATIONAL DATA FILE
HIGH GROWTH

MODEL:	MODEL01	SSE	0.026908	F RATIO	214.18
		DFE	9	PROB>F	0.0001
DEP VAR:	RPT1	MSE	0.002989735	R-SQUARE	0.9958
	SUMWGT OF DISTANCE				

DURBIN-WATSON D STATISTIC = 1.8287
FIRST ORDER AUTOCORRELATION = 0.0571

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T RATIO	PROB>|T|	VARIABLE LABEL
INTERCEPT	1	-2.860579	1.507999	-1.8969	0.0903	
FUELAD	1	0.064957	0.012009	5.4089	0.0004	
OTC	1	-0.019254	0.005707225	-3.3735	0.0082	
AVESEATS	1	0.056713	0.067863	0.8357	0.4249	MEAN OF MINSEATS
ADF	1	-0.00103343	0.008940753	-0.1156	0.9105	MEAN OF DISTANCE
GNP72	1	0.001752865	0.0005748655	3.0492	0.0138	
NTAKEOFF	1	0.0008106179	0.0002430889	3.3347	0.0087	N OF DISTANCE
DUM1	1	-0.035095	0.043237	-0.8117	0.4379	
DUM2	1	0.063637	0.044997	1.4142	0.1909	
DUM3	1	0.218331	0.051239	4.2610	0.0021	
DEREG	1	-0.082423	0.088502	-0.9313	0.3760	

NATLDATA-HISTORICAL AND ACTUAL NATIONAL DATA FILE
HIGH GROWTH

MODEL: MODEL01	SSE	0.00494542	F RATIO	80.25
	DFE	9	PROB>F	0.0001
DEP VAR: AIOPS FREQUENCY COUNT	MSE	0.0005494911	R-SQUARE	0.9889

DURBIN-WATSON D STATISTIC = 2.5772
FIRST ORDER AUTOCORRELATION = -0.3073

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T RATIO	PROB>|T|	VARIABLE LABEL
INTERCEPT	1	-1.533821	0.646495	-2.3725	0.0417	
FUELAD	1	0.009601088	0.00514845	1.8649	0.0951	
OTC	1	-0.0005276	0.002446746	-0.2156	0.8341	
AVESEATS	1	-0.00670574	0.029093	-0.2305	0.8229	MEAN OF MINSEATS
ADF	1	0.00963445	0.003832993	2.5136	0.0331	MEAN OF DISTANCE
GNP72	1	0.0005532576	0.0002464508	2.2449	0.0514	
HTAKEOFF	1	.00005435436	0.0001042147	0.5216	0.6146	N OF DISTANCE
DUM1	1	-0.018601	0.018536	-1.0035	0.3418	
DUM2	1	0.004220508	0.019291	0.2188	0.8317	
DUM3	1	-0.00881159	0.021967	-0.4011	0.6977	
DEREG	1	0.006965297	0.037942	0.1836	0.8584	

NATLDATA-HISTORICAL AND ACTUAL NATIONAL DATA FILE
HIGH GROWTH

MODEL:	MODEL01	SSE	18.326384	F RATIO	5.94
		DFE	9	PROB>F	0.0066
DEP VAR:	FARE	MSE	2.036265	R-SQUARE	0.8684

DURBIN-WATSON D STATISTIC = 1.8092
FIRST ORDER AUTOCORRELATION = 0.0718

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T RATIO	PROB>|T|	VARIABLE LABEL
INTERCEPT	1	173.078484	39.355160	4.3979	0.0017	
FUELAD	1	0.339879	0.313410	1.0845	0.3064	
OTC	1	0.256943	0.148945	1.7251	0.1186	
AVESEATS	1	-1.082193	1.771049	-0.6110	0.5563	MEAN OF MINSEATS
ADF	1	-0.905735	0.233332	-3.8817	0.0037	MEAN OF DISTANCE
GNP72	1	-0.016768	0.015003	-1.1177	0.2927	
NTAKEOFF	1	0.015851	0.006344041	2.4985	0.0339	N OF DISTANCE
DUM1	1	2.301629	1.128392	2.0397	0.0718	
DUM2	1	-1.880268	1.174321	-1.6012	0.1438	
DUM3	1	-1.496402	1.337228	-1.1190	0.2921	
DEREG	1	-2.627398	2.309682	-1.1376	0.2847	

NATLDATA-HISTORICAL AND ACTUAL NATIONAL DATA FILE
HIGH GROWTH

MODEL: MODEL01	SSE	9745.048	F RATIO	32.90
	DFE	9	PROB>F	0.0001
DEP VAR: SEATMI	MSE	1082.783	R-SQUARE	0.9734

DURBIN-WATSON D STATISTIC = 2.5786
FIRST ORDER AUTOCORRELATION = -0.3130

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T RATIO	PROB>|T|	VARIABLE LABEL
INTERCEPT	1	-3609.74	907.518077	-3.9776	0.0032	
FUELAD	1	3.570678	7.227148	0.4941	0.6331	
OIC	1	0.627942	3.434625	0.1828	0.8590	
AVESEATS	1	65.316591	40.839860	1.5993	0.1442	MEAN OF MINSEATS
ADF	1	19.374305	5.380572	3.6008	0.0057	MEAN OF DISTANCE
GNP72	1	1.077253	0.345956	3.1138	0.0124	
NTAKEOFF	1	-0.355372	0.146292	-2.4292	0.0380	N OF DISTANCE
DUM1	1	-61.662716	26.020379	-2.3698	0.0419	
DUM2	1	26.664398	27.079485	0.9847	0.3505	
DUM3	1	10.805460	30.836082	0.3504	0.7341	
DEREG	1	-17.028252	53.260573	-0.3197	0.7565	

NATLDATA-HISTORICAL AND ACTUAL NATIONAL DATA FILE
HIGH GROWTH AND LOW GROWTH

MODEL:	MODEL01	SSE	609.251300	F RATIO	191.70
		DFE	9	PROB>F	0.0001
DEP VAR:	RPIDIST	MSE	67.694589	R-SQUARE	0.9953
	SUM OF DISTANCE				

DURBIN-WATSON D STATISTIC = 1.7879
FIRST ORDER AUTOCORRELATION = 0.0743

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T RATIO	PROB>|T|	VARIABLE LABEL
INTERCEPT	1	-618.765955	226.914121	-2.7269	0.0233	
FUELAD	1	8.777166	1.807063	4.8571	0.0009	
OTC	1	-2.445242	0.858787	-2.8473	0.0192	
AVESEATS	1	6.689489	10.211522	0.6551	0.5288	MEAN OF MINSEATS
ADF	1	2.217030	1.345348	1.6479	0.1338	MEAN OF DISTANCE
GNP72	1	0.206193	0.086502	2.3837	0.0410	
NTAKEOFF	1	0.088898	0.036578	2.4303	0.0380	N OF DISTANCE
DUM1	1	-5.493793	6.506087	-0.8444	0.4203	
DUM2	1	9.009530	6.770904	1.3306	0.2160	
DUM3	1	26.808585	7.710196	3.4770	0.0070	
DEREG	1	-10.727645	13.317174	-0.8055	0.4413	

FORLOGRO-FORECAST VARIABLES FOR LOW GROWTH NATIONAL MODEL

OBS	QTR	AVEDIST	GNP72	OTC	FUELAD	NTAKEOFF	ADF	AVESEATS	DUM1	DUM2	DUM3	DEREG
1	751	98.942	1169.8	97.64	32.1	1576	118.213	12.4520	1	0	0	0
2	752	110.084	1188.2	99.19	32.2	1600	116.843	12.5266	0	1	0	0
3	753	110.040	1220.7	101.84	31.1	1634	115.254	12.1513	0	0	1	0
4	754	108.922	1229.8	102.06	31.4	1667	118.201	12.2573	0	0	0	0
5	761	109.860	1255.5	101.82	31.9	1585	117.264	12.2814	1	0	0	0
6	762	106.749	1268.0	104.05	31.8	1785	115.243	12.0257	0	1	0	0
7	763	106.968	1276.5	106.26	33.3	1682	114.598	11.7864	0	0	1	0
8	764	102.419	1284.0	106.54	32.1	1737	115.978	11.7325	0	0	0	0
9	771	104.907	1315.7	106.24	33.0	1713	118.742	12.0869	1	0	0	0
10	772	105.794	1331.2	107.37	33.8	1933	116.273	11.8695	0	1	0	0
11	773	102.889	1353.9	106.42	34.4	1982	120.849	11.3460	0	0	1	0
12	774	109.636	1361.3	104.78	33.2	1981	120.879	12.0532	0	0	0	0
13	781	97.030	1367.8	104.81	33.6	2018	121.338	12.4742	1	0	0	0
14	782	96.163	1395.2	103.10	35.0	2176	120.880	12.6749	0	1	0	1
15	783	96.336	1407.3	103.38	35.2	2191	120.365	12.6587	0	0	1	1
16	784	114.977	1426.6	103.97	34.7	2028	120.163	13.1445	0	0	0	1
17	791	115.215	1430.6	105.28	35.5	2126	127.673	13.0223	1	0	0	1
18	792	110.358	1422.3	108.27	40.8	2449	131.730	13.0405	0	1	0	1
19	793	111.007	1433.3	111.63	47.2	2351	131.357	13.1560	0	0	1	1
20	794	109.441	1438.4	127.55	48.8	2411	132.780	13.5221	0	0	0	1
21	801	110.000	.	.	.	.	.	.	1	0	0	1
22	802	110.000	.	.	.	.	.	.	0	1	0	1
23	803	110.000	.	.	.	.	.	.	0	0	1	1
24	804	110.000	.	.	.	.	.	.	0	0	0	1
25	811	110.000	1420.0	129.00	69.5	2710	132.000	14.3000	1	0	0	1
26	812	110.000	1427.0	129.00	70.0	2769	133.000	14.4000	0	1	0	1

OBS	RPT1	ATOPS	FARE	SEATMI	RPTDIST	PRPT1	PATOPS	PFARE	PSEATMI	PRPTDIST
1	1.19752	0.502801	95.28	326.022	141.562	1.22159	0.49253	96.199	308.24	145.42
2	1.30907	0.490517	94.01	356.008	152.956	1.35432	0.51329	93.681	387.53	160.40
3	1.47982	0.509153	96.80	358.317	170.555	1.45143	0.49533	96.211	337.03	165.76
4	1.27764	0.533248	95.57	374.703	151.019	1.29402	0.54142	95.452	389.53	153.10
5	1.28891	0.531816	96.72	377.656	151.142	1.27694	0.52832	96.955	369.75	148.67
6	1.47466	0.547389	97.12	369.845	169.944	1.43301	0.54468	97.111	374.09	163.90
7	1.63164	0.557751	99.02	370.102	186.983	1.62593	0.54373	98.909	354.17	186.13
8	1.43850	0.577412	100.07	365.176	166.834	1.37751	0.56167	99.623	351.01	157.24
9	1.49949	0.556343	98.64	371.284	178.052	1.46001	0.59235	98.356	411.74	173.28
10	1.75497	0.644299	98.40	425.822	204.056	1.78468	0.62046	100.434	380.12	207.87
11	1.96570	0.665959	97.47	409.173	237.553	2.04173	0.67652	97.596	427.31	248.94
12	1.83373	0.664393	97.67	462.090	221.659	1.82926	0.67425	97.331	466.28	221.84
13	1.88312	0.670160	100.47	426.916	228.494	1.88436	0.66669	99.382	436.32	228.25
14	2.17471	0.712879	97.60	457.312	262.879	2.21249	0.72880	94.852	489.14	268.52
15	2.43052	0.697318	94.83	447.562	292.548	2.40777	0.72020	95.895	470.84	289.97
16	2.05692	0.731737	93.07	582.045	247.165	2.07506	0.72051	94.123	565.15	249.62
17	2.11232	0.808387	91.63	638.348	269.686	2.13847	0.78962	91.849	614.18	273.31
18	2.83910	0.925830	90.75	701.253	373.994	2.76802	0.91367	91.802	679.36	363.14
19	3.23971	0.962300	94.19	739.659	425.557	3.22053	0.95671	93.699	735.46	422.40
20	2.84554	0.980886	99.16	763.992	377.819	2.87648	0.98982	99.010	776.03	382.70
21	.	.	.	.	.	.	.	.	.	.
22	.	.	.	.	.	.	.	.	.	.
23	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	3.11311	1.16254	113.632	914.34	410.93
26	.	.	.	.	.	3.30906	1.20621	109.424	955.31	440.10

FORLOGRO-FORECAST VARIABLES FOR LOW GROWTH NATIONAL MODEL

OBS	QTR	AVEDIST	GNP72	OTC	FUELAD	NTAKEOFF	ADF	AVESEATS	DUM1	DUM2	DUM3	DEREG	RPTI	ATOPS	FARE	SEATMI	RPTDIST	PRPTI	PATOPS	PFARE	PSEATMI	PRPTDIST
27	813	110	1441.0	129	70.6	2829	134	14.6	0	0	1	1	.	.	.	.	.	3.58621	1.21823	109.606	978.24	480.55
28	814	110	1463.0	129	71.1	2891	135	14.7	0	0	0	1	.	.	.	.	.	3.49382	1.25635	110.872	1015.76	471.67
29	821	110	1477.0	130	71.6	2954	136	14.8	1	0	0	1	.	.	.	.	.	3.55219	1.26216	113.351	1027.40	483.10
30	822	110	1492.0	130	72.6	3018	136	15.0	0	1	0	1	.	.	.	.	.	3.80540	1.30502	110.055	1076.64	517.53
31	823	110	1507.0	130	72.7	3084	137	15.1	0	0	1	1	.	.	.	.	.	4.05102	1.31379	110.254	1091.11	554.99
32	824	110	1521.5	130	73.2	3151	138	15.3	0	0	0	1	.	.	.	.	.	3.95520	1.34736	111.617	1133.81	545.82
33	831	110	1533.0	130	73.7	3216	138	15.4	1	0	0	1	.	.	.	.	.	4.03111	1.34279	114.818	1137.34	556.29
34	832	110	1544.0	130	74.1	3282	139	15.6	0	1	0	1	.	.	.	.	.	4.23891	1.38742	110.511	1190.40	589.21
35	833	110	1556.0	130	74.6	3350	140	15.7	0	0	1	1	.	.	.	.	.	4.50688	1.39848	110.928	1207.59	630.96
36	834	110	1567.0	130	75.0	3419	141	15.8	0	0	0	1	.	.	.	.	.	4.39438	1.42994	112.455	1242.61	619.61
37	841	110	1579.0	130	75.5	3489	142	16.0	1	0	0	1	.	.	.	.	.	4.47985	1.43487	114.713	1262.69	636.14
38	842	110	1590.0	130	76.0	3561	142	16.1	0	1	0	1	.	.	.	.	.	4.69438	1.47182	111.550	1303.30	666.60
39	843	110	1602.0	130	76.4	3635	143	16.3	0	0	1	1	.	.	.	.	.	4.96639	1.48159	111.919	1328.24	710.19
40	844	110	1614.0	130	76.9	3709	144	16.4	0	0	0	1	.	.	.	.	.	4.86619	1.51482	113.543	1366.37	700.73
41	851	110	1626.0	130	77.4	3781	145	16.6	1	0	0	1	.	.	.	.	.	4.95328	1.51987	115.833	1387.64	718.23
42	852	110	1638.0	130	77.9	3855	145	16.8	0	1	0	1	.	.	.	.	.	5.17686	1.55681	112.576	1438.49	750.64
43	853	110	1650.0	130	78.3	3929	146	16.9	0	0	1	1	.	.	.	.	.	5.44319	1.56725	113.054	1456.75	794.71
44	854	110	1663.0	130	78.8	4006	147	17.1	0	0	0	1	.	.	.	.	.	5.35285	1.60053	114.600	1505.30	786.87
45	861	110	1675.0	130	79.3	4084	148	17.2	1	0	0	1	.	.	.	.	.	5.43913	1.60657	117.093	1519.82	804.99
46	862	110	1688.0	130	79.8	4163	149	17.4	0	1	0	1	.	.	.	.	.	5.66748	1.65397	112.993	1582.85	844.45
47	863	110	1700.0	130	80.3	4244	150	17.6	0	0	1	1	.	.	.	.	.	5.95166	1.66508	113.507	1611.79	892.75
48	864	110	1713.0	130	80.8	4326	150	17.7	0	0	0	1	.	.	.	.	.	5.86073	1.68967	116.147	1644.89	879.11
49	871	110	1727.0	130	81.3	4405	151	17.9	1	0	0	1	.	.	.	.	.	5.95700	1.69620	118.514	1669.91	899.51
50	872	110	1740.0	130	81.8	4485	152	18.1	0	1	0	1	.	.	.	.	.	6.18616	1.74366	114.430	1735.81	940.30
51	873	110	1754.0	130	82.3	4567	153	18.4	0	0	1	1	.	.	.	.	.	6.48032	1.75525	114.818	1776.31	991.49
52	874	110	1768.0	130	82.9	4650	154	18.6	0	0	0	1	.	.	.	.	.	6.40310	1.79037	116.477	1831.55	986.08
53	881	110	1782.0	130	83.4	4735	154	18.8	1	0	0	1	.	.	.	.	.	6.50527	1.78760	119.845	1848.37	1001.81
54	882	110	1796.0	130	83.9	4822	155	19.0	0	1	0	1	.	.	.	.	.	6.74185	1.83599	115.855	1918.61	1044.99
55	883	110	1810.0	130	84.4	4910	156	19.3	0	0	1	1	.	.	.	.	.	7.04088	1.84791	116.339	1961.55	1098.38
56	884	110	1824.0	130	85.0	4999	157	19.5	0	0	0	1	.	.	.	.	.	6.96851	1.88335	118.093	2019.90	1094.06
57	891	110	1839.0	130	85.6	5090	157	19.8	1	0	0	1	.	.	.	.	.	7.08947	1.88175	121.465	2049.22	1113.05
58	892	110	1853.0	130	86.0	5183	158	20.0	0	1	0	1	.	.	.	.	.	7.32442	1.92950	117.536	2122.45	1157.26
59	893	110	1868.0	130	86.6	5278	159	20.2	0	0	1	1	.	.	.	.	.	7.63170	1.94399	118.256	2159.77	1213.44
60	894	110	1883.0	130	87.1	5374	160	20.5	0	0	0	1	.	.	.	.	.	7.56594	1.97874	119.962	2231.03	1210.55
61	901	110	1898.0	130	87.6	5472	160	20.7	1	0	0	1	.	.	.	.	.	7.68040	1.97722	123.519	2251.07	1228.86
62	902	110	1913.0	130	88.0	5572	161	21.0	0	1	0	1	.	.	.	.	.	7.92845	2.02524	119.576	2339.15	1276.48
63	903	110	1928.0	130	88.5	5674	162	21.3	0	0	1	1	.	.	.	.	.	8.24058	2.03848	120.265	2388.08	1334.97
64	904	110	1943.0	130	88.9	5777	163	21.5	0	0	0	1	.	.	.	.	.	8.16832	2.07332	122.156	2451.70	1331.44
65	911	110	1958.0	130	89.4	5883	163	21.8	1	0	0	1	.	.	.	.	.	8.29494	2.07157	125.732	2483.81	1352.07
66	912	110	1974.0	130	89.8	5990	164	22.0	0	1	0	1	.	.	.	.	.	8.54474	2.12119	121.991	2566.64	1401.34
67	913	110	1989.0	130	90.2	6099	165	22.3	0	0	1	1	.	.	.	.	.	8.85605	2.13385	122.757	2617.16	1461.25
68	914	110	2005.0	130	90.7	6210	166	22.6	0	0	0	1	.	.	.	.	.	8.80420	2.16997	124.684	2697.27	1461.50
69	921	110	2021.0	130	91.1	6324	166	22.9	1	0	0	1	.	.	.	.	.	8.93256	2.16824	128.336	2730.90	1482.81
70	922	110	2037.0	130	91.6	6439	167	23.1	0	1	0	1	.	.	.	.	.	9.19535	2.21926	124.756	2819.57	1535.62
71	923	110	2053.0	130	92.0	6557	168	23.4	0	0	1	1	.	.	.	.	.	9.51570	2.23296	125.647	2873.82	1598.64
72	924	110	2069.0	130	92.5	6676	169	23.7	0	0	0	1	.	.	.	.	.	9.47034	2.26951	127.701	2958.31	1600.49
73	931	110	.	130	.	.	.	.	1	0	0	1	.	.	.	.	.	.	.	.	.	.
74	932	110	.	130	.	.	.	.	0	1	0	1	.	.	.	.	.	.	.	.	.	.
75	933	110	.	130	.	.	.	.	0	0	1	1	.	.	.	.	.	.	.	.	.	.

FORLOGRO-FORECAST VARIABLES FOR LOW GROWTH NATIONAL MODEL

OBS	QTR	AVEDIST	GNP72	OTC	FUELAD	NTAKEOFF	ADF	AVESEATS	DUM1	DUM2	DUM3	DEREG	RPT1	ATOPS	FARE	SEATMI	RPTDIST	PRPT1	PATOPS	PFARE	PSEATMI	PRPTDIST
76	934	110	.	130	.	.	.	.	0	0	0	1	.	.	.	.	.	.	.	.	.	.
77	941	110	.	130	.	.	.	.	1	0	0	1	.	.	.	.	.	.	.	.	.	.
78	942	110	.	130	.	.	.	.	0	1	0	1	.	.	.	.	.	.	.	.	.	.
79	943	110	.	130	.	.	.	.	0	0	1	1	.	.	.	.	.	.	.	.	.	.
80	944	110	.	130	.	.	.	.	0	0	0	1	.	.	.	.	.	.	.	.	.	.

FORLOGRO-FORECAST LOW GROWTH PREDICTIONS FOR NATIONAL MODEL

OBS	QIR	FARE	RPTDIST	RPTI	ATOPS	SEAIMI	PRPTI	PATOPS	PFARE	PSEAIMI	PRPTDIST
1	751	95.28	141.562	1.19752	0.502801	326.022	1.22159	0.49253	96.199	308.24	145.42
2	752	94.01	152.956	1.30907	0.490517	356.008	1.35432	0.51329	93.681	387.53	160.40
3	753	96.80	170.555	1.47982	0.509153	358.317	1.45143	0.49533	96.211	337.03	165.76
4	754	95.57	151.019	1.27764	0.533248	374.703	1.29402	0.54142	95.452	389.53	153.10
5	761	96.72	151.142	1.28891	0.531816	377.656	1.27694	0.52832	96.955	369.75	148.67
6	762	97.12	169.944	1.47466	0.547389	369.845	1.43301	0.54468	97.111	374.09	163.90
7	763	99.02	186.983	1.63164	0.557751	370.102	1.62593	0.54373	98.909	354.17	186.13
8	764	100.07	166.834	1.43850	0.577412	365.176	1.37751	0.56167	99.623	351.01	157.24
9	771	98.64	178.052	1.49949	0.556343	371.284	1.46001	0.59235	98.356	411.74	173.28
10	772	98.40	204.056	1.75497	0.644299	425.822	1.78468	0.62046	100.434	380.12	207.87
11	773	97.47	237.553	1.96570	0.665959	409.173	2.04173	0.67652	97.596	427.31	248.94
12	774	97.67	221.659	1.83373	0.664393	462.090	1.82926	0.67425	97.331	466.28	221.84
13	781	100.47	228.494	1.88312	0.670160	426.916	1.88436	0.66669	99.382	436.32	228.25
14	782	97.60	262.879	2.17471	0.712879	457.312	2.21249	0.72880	94.852	489.14	268.52
15	783	94.83	292.548	2.43052	0.697318	447.562	2.40777	0.72020	95.895	470.84	289.97
16	784	93.07	247.165	2.05692	0.731737	582.045	2.07506	0.72051	94.123	565.15	249.62
17	791	91.63	269.686	2.11232	0.808387	638.348	2.13847	0.78962	91.849	614.18	273.31
18	792	90.75	373.994	2.83910	0.925830	701.253	2.76802	0.91367	91.802	679.36	363.14
19	793	94.19	425.557	3.23971	0.962300	739.659	3.22053	0.95671	93.699	735.46	422.40
20	794	99.16	377.819	2.84554	0.980886	763.992	2.87648	0.98982	99.010	776.03	382.70
21	801	.	.	.	.	.	.	.	.	.	.
22	802	.	.	.	.	.	.	.	.	.	.
23	803	.	.	.	.	.	.	.	.	.	.
24	804	.	.	.	.	.	.	.	.	.	.
25	811	.	.	.	.	.	3.11311	1.16254	113.632	914.34	410.93
26	812	.	.	.	.	.	3.30906	1.20621	109.424	955.31	440.10
27	813	.	.	.	.	.	3.58621	1.21823	109.606	978.24	480.55
28	814	.	.	.	.	.	3.49382	1.25635	110.872	1015.76	471.67
29	821	.	.	.	.	.	3.55219	1.26216	113.351	1027.40	483.10
30	822	.	.	.	.	.	3.80540	1.30502	110.055	1076.64	517.53
31	823	.	.	.	.	.	4.05102	1.31379	110.254	1091.11	554.99
32	824	.	.	.	.	.	3.95520	1.34736	111.617	1133.81	545.82
33	831	.	.	.	.	.	4.03111	1.34279	114.818	1137.34	556.29
34	832	.	.	.	.	.	4.23891	1.38742	110.511	1190.40	589.21
35	833	.	.	.	.	.	4.50688	1.39848	110.928	1207.59	630.96
36	834	.	.	.	.	.	4.39438	1.42994	112.455	1242.61	619.61
37	841	.	.	.	.	.	4.47985	1.43487	114.713	1262.69	636.14
38	842	.	.	.	.	.	4.69438	1.47182	111.550	1303.30	666.60
39	843	.	.	.	.	.	4.96639	1.48159	111.919	1328.24	710.19
40	844	.	.	.	.	.	4.86619	1.51482	113.543	1366.37	700.73
41	851	.	.	.	.	.	4.95328	1.51987	115.833	1387.64	718.23
42	852	.	.	.	.	.	5.17686	1.55681	112.576	1438.49	750.64
43	853	.	.	.	.	.	5.44319	1.56725	113.054	1456.75	794.71
44	854	.	.	.	.	.	5.35285	1.60053	114.600	1505.30	786.87
45	861	.	.	.	.	.	5.43913	1.60657	117.093	1519.82	804.99
46	862	.	.	.	.	.	5.66748	1.65397	112.993	1582.85	844.45
47	863	.	.	.	.	.	5.95166	1.66508	113.507	1611.79	892.75
48	864	.	.	.	.	.	5.86073	1.68967	116.147	1644.89	879.11
49	871	.	.	.	.	.	5.95700	1.69620	118.514	1669.91	899.51
50	872	.	.	.	.	.	6.18616	1.74366	114.430	1735.81	940.30
51	873	.	.	.	.	.	6.48032	1.75525	114.818	1776.31	991.49
52	874	.	.	.	.	.	6.40310	1.79037	116.477	1831.55	986.08
53	881	.	.	.	.	.	6.50527	1.78760	119.845	1848.37	1001.81
54	882	.	.	.	.	.	6.74185	1.83599	115.855	1918.61	1044.99
55	883	.	.	.	.	.	7.04088	1.84791	116.339	1961.55	1098.38
56	884	.	.	.	.	.	6.96851	1.88335	118.093	2019.90	1094.06

FORLOGRO-FORECAST LOW GROWTH PREDICTIONS FOR NATIONAL MODEL

OBS	QTR	FARE	RPTDIST	RPT1	ATOPS	SEATMI	PRPT1	PATOPS	PFARE	PSEATMI	PRPTDIST
57	891	.	.	.	.	.	7.08947	1.88175	121.465	2049.22	1113.05
58	892	.	.	.	.	.	7.32442	1.92950	117.536	2122.45	1157.26
59	893	.	.	.	.	.	7.63170	1.94399	118.256	2159.77	1213.44
60	894	.	.	.	.	.	7.56594	1.97874	119.962	2231.03	1210.55
61	901	.	.	.	.	.	7.68040	1.97722	123.519	2251.07	1228.86
62	902	.	.	.	.	.	7.92845	2.02524	119.576	2339.15	1276.48
63	903	.	.	.	.	.	8.24058	2.03848	120.265	2388.08	1334.97
64	904	.	.	.	.	.	8.16832	2.07332	122.156	2451.70	1331.44
65	911	.	.	.	.	.	8.29494	2.07157	125.732	2483.81	1352.07
66	912	.	.	.	.	.	8.54474	2.12119	121.991	2566.64	1401.34
67	913	.	.	.	.	.	8.85605	2.13385	122.757	2617.16	1461.25
68	914	.	.	.	.	.	8.80420	2.16997	124.684	2697.27	1461.50
69	921	.	.	.	.	.	8.93256	2.16824	128.336	2730.90	1482.81
70	922	.	.	.	.	.	9.19535	2.21926	124.756	2819.57	1535.62
71	923	.	.	.	.	.	9.51570	2.23296	125.647	2873.82	1598.64
72	924	.	.	.	.	.	9.47034	2.26951	127.701	2958.31	1600.49
73	931	.	.	.	.	.	.	.	.	.	.
74	932	.	.	.	.	.	.	.	.	.	.
75	933	.	.	.	.	.	.	.	.	.	.
76	934	.	.	.	.	.	.	.	.	.	.
77	941	.	.	.	.	.	.	.	.	.	.
78	942	.	.	.	.	.	.	.	.	.	.
79	943	.	.	.	.	.	.	.	.	.	.
80	944	.	.	.	.	.	.	.	.	.	.

FORHIGRO-FORECAST VARIABLES FOR HIGH GROWTH NATIONAL MODEL

OBS	QTR	AVEDIST	GNP72	OIC	FUELAD	NTAKEOFF	ADF	AVESEATS	DUM1	DUM2	DUM3	DEREG
1	751	98.942	1169.8	97.64	32.1	1576	118.213	12.4520	1	0	0	0
2	752	110.084	1188.2	99.19	32.2	1600	116.843	12.5266	0	1	0	0
3	753	110.040	1220.7	101.84	31.1	1634	115.254	12.1513	0	0	1	0
4	754	108.922	1229.8	102.06	31.4	1667	118.201	12.2573	0	0	0	0
5	761	109.860	1255.5	101.82	31.9	1585	117.264	12.2814	1	0	0	0
6	762	106.749	1268.0	104.05	31.8	1705	115.243	12.0257	0	1	0	0
7	763	106.968	1276.5	106.26	33.3	1682	114.598	11.7864	0	0	1	0
8	764	102.419	1284.0	106.54	32.1	1737	115.978	11.7325	0	0	0	0
9	771	104.907	1315.7	106.24	33.0	1713	118.742	12.0869	1	0	0	0
10	772	105.794	1331.2	107.37	33.8	1933	116.273	11.8695	0	1	0	0
11	773	102.889	1353.9	106.42	34.4	1982	120.849	11.3460	0	0	1	0
12	774	109.636	1361.3	104.78	33.2	1981	120.879	12.0532	0	0	0	0
13	781	97.030	1367.8	104.81	33.6	2018	121.338	12.4742	1	0	0	0
14	782	96.163	1395.2	103.10	35.0	2176	120.880	12.6749	0	1	0	1
15	783	96.336	1407.3	103.38	35.2	2191	120.365	12.6587	0	0	1	1
16	784	114.977	1426.6	103.97	34.7	2028	120.163	13.1445	0	0	0	1
17	791	115.215	1430.6	105.28	35.5	2126	127.673	13.0223	1	0	0	1
18	792	110.358	1422.3	108.27	40.8	2449	131.730	13.0405	0	1	0	1
19	793	111.007	1433.3	111.63	47.2	2351	131.357	13.1560	0	0	1	1
20	794	109.441	1438.4	127.55	48.8	2411	132.780	13.5221	0	0	0	1
21	801	110.000	.	.	.	.	.	.	1	0	0	1
22	802	110.000	.	.	.	.	.	.	0	1	0	1
23	803	110.000	.	.	.	.	.	.	0	0	1	1
24	804	110.000	.	.	.	.	.	.	0	0	0	1
25	811	110.000	1433.7	129.00	69.5	2716	132.000	14.3000	1	0	0	1
26	812	110.000	1442.1	129.00	70.0	2782	133.000	14.4000	0	1	0	1

OBS	RPTI	ATOPS	FARE	SEATMI	RPTDIST	PRPTI	PATOPS	PFARE	PSEATMI	PRPTDIST
1	1.19752	0.502801	95.28	326.022	141.562	1.22159	0.49253	96.199	308.24	145.42
2	1.30907	0.490517	94.01	356.008	152.956	1.35432	0.51329	93.681	387.53	160.40
3	1.47982	0.509153	96.80	358.317	170.555	1.45143	0.49533	96.211	337.03	165.76
4	1.27764	0.533248	95.57	374.703	151.019	1.29402	0.54142	95.452	389.53	153.10
5	1.28891	0.531816	96.72	377.656	151.142	1.27694	0.52832	96.955	369.75	148.67
6	1.47466	0.547389	97.12	369.845	169.944	1.43301	0.54468	97.111	374.09	163.90
7	1.63164	0.557751	99.02	370.102	186.983	1.62593	0.54373	98.909	354.17	186.13
8	1.43850	0.577412	100.07	365.176	166.834	1.37751	0.56167	99.623	351.01	157.24
9	1.49949	0.556343	98.64	371.284	178.052	1.46001	0.59235	98.356	411.74	173.28
10	1.75497	0.644299	98.40	425.822	204.056	1.78468	0.62046	100.434	380.12	207.87
11	1.96570	0.665959	97.47	409.173	237.553	2.04173	0.67652	97.596	427.31	248.94
12	1.83373	0.664393	97.67	462.090	221.659	1.82926	0.67425	97.331	466.28	221.84
13	1.88312	0.670160	100.47	426.916	228.494	1.88436	0.66669	99.382	436.32	228.25
14	2.17471	0.712879	97.60	457.312	262.879	2.21249	0.72880	94.852	489.14	268.52
15	2.43052	0.697318	94.83	447.562	292.548	2.40777	0.72020	95.895	470.84	289.97
16	2.05692	0.731737	93.07	582.045	247.165	2.07506	0.72051	94.123	565.15	249.62
17	2.11232	0.808387	91.63	638.348	269.686	2.13847	0.78962	91.849	614.18	273.31
18	2.83910	0.925830	90.75	701.253	373.994	2.76802	0.91367	91.802	679.36	363.14
19	3.23971	0.962300	94.19	739.659	425.557	3.22053	0.95671	93.699	735.46	422.40
20	2.84554	0.980886	99.16	763.992	377.819	2.87648	0.98982	99.010	776.03	382.70
21	.	.	.	.	.	.	.	.	.	.
22	.	.	.	.	.	.	.	.	.	.
23	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	3.14199	1.17045	113.498	920.56	414.74
26	.	.	.	.	.	3.34606	1.21527	109.377	962.49	445.03

FORHIGRO-FORECAST VARIABLES FOR HIGH GROWTH NATIONAL MODEL

OBS	QTR	AVEDIST	GNP72	OTC	FUELAD	NTAKEOFF	ADF	AVESEATS	DUM1	DUM2	DUM3	DEREG	RPT1	ATOPS	FARE	SEATMI	RPTDIST	PRPT1	PATOPS	PFARE	PSEATMI	PRPTDIST
27	813	110	1453.0	129	70.6	2848	134	14.6	0	0	1	1	.	.	.	.	.	3.6226	1.22591	109.706	984.40	485.43
28	814	110	1464.1	129	71.1	2917	135	14.7	0	0	0	1	.	.	.	.	.	3.5168	1.25837	111.266	1017.39	474.77
29	821	110	1480.1	130	71.6	2988	136	14.8	1	0	0	1	.	.	.	.	.	3.5852	1.26572	113.838	1030.30	487.59
30	822	110	1494.9	130	72.6	3060	136	15.0	0	1	0	1	.	.	.	.	.	3.8445	1.30890	110.672	1079.85	522.86
31	823	110	1509.8	130	72.7	3133	137	15.1	0	0	1	1	.	.	.	.	.	4.0956	1.31801	110.984	1094.60	561.10
32	824	110	1522.0	130	73.2	3209	138	15.3	0	0	0	1	.	.	.	.	.	4.0031	1.35079	112.528	1136.69	552.43
33	831	110	1537.3	130	73.7	3286	138	15.4	1	0	0	1	.	.	.	.	.	4.0954	1.34897	115.855	1142.58	565.16
34	832	110	1550.2	130	74.1	3366	139	15.6	0	1	0	1	.	.	.	.	.	4.3179	1.39541	111.739	1197.26	600.18
35	833	110	1564.7	130	74.6	3447	140	15.7	0	0	1	1	.	.	.	.	.	4.6008	1.40857	112.319	1216.30	644.11
36	834	110	1582.9	130	75.0	3530	141	15.8	0	0	0	1	.	.	.	.	.	4.5122	1.44477	113.948	1255.50	636.22
37	841	110	1598.6	130	75.5	3615	142	16.0	1	0	0	1	.	.	.	.	.	4.6163	1.45257	116.382	1278.26	655.52
38	842	110	1616.6	130	76.0	3702	142	16.1	0	1	0	1	.	.	.	.	.	4.8553	1.49420	113.339	1323.12	689.45
39	843	110	1634.8	130	76.4	3792	143	16.3	0	0	1	1	.	.	.	.	.	5.1511	1.50827	113.858	1352.16	736.61
40	844	110	1654.2	130	76.9	3884	144	16.4	0	0	0	1	.	.	.	.	.	5.0785	1.54658	115.643	1395.01	731.31
41	851	110	1672.5	130	77.4	3977	145	16.6	1	0	0	1	.	.	.	.	.	5.1937	1.55625	118.160	1420.86	753.08
42	852	110	1686.2	130	77.9	4073	145	16.8	0	1	0	1	.	.	.	.	.	5.4381	1.59533	115.223	1474.08	788.52
43	853	110	1705.5	130	78.3	4172	146	16.9	0	0	1	1	.	.	.	.	.	5.7375	1.61116	115.975	1497.57	837.67
44	854	110	1725.3	130	78.8	4272	147	17.1	0	0	0	1	.	.	.	.	.	5.6777	1.64945	117.772	1551.31	834.62
45	861	110	1740.1	130	79.3	4375	148	17.2	1	0	0	1	.	.	.	.	.	5.7891	1.65841	120.614	1568.85	856.79
46	862	110	1753.0	130	79.8	4481	149	17.4	0	1	0	1	.	.	.	.	.	6.0392	1.70722	116.944	1633.81	899.84
47	863	110	1763.9	130	80.3	4589	150	17.6	0	0	1	1	.	.	.	.	.	6.3433	1.71918	117.904	1664.17	951.50
48	864	110	1784.4	130	80.8	4700	150	17.7	0	0	0	1	.	.	.	.	.	6.2891	1.74950	120.878	1703.14	943.36
49	871	110	1800.9	130	81.3	4802	151	17.9	1	0	0	1	.	.	.	.	.	6.4084	1.75866	123.568	1731.40	967.66
50	872	110	1817.6	130	81.8	4910	152	18.1	0	1	0	1	.	.	.	.	.	6.6667	1.80969	119.865	1801.55	1013.34
51	873	110	1834.4	130	82.3	5014	153	18.4	0	0	1	1	.	.	.	.	.	6.9836	1.82403	120.556	1845.92	1068.49
52	874	110	1851.3	130	82.9	5123	154	18.6	0	0	0	1	.	.	.	.	.	6.9325	1.86217	122.578	1905.00	1067.61
53	881	110	1868.4	130	83.4	5223	154	18.8	1	0	0	1	.	.	.	.	.	7.0523	1.86192	126.132	1925.23	1086.05
54	882	110	1885.7	130	83.9	5324	155	19.0	0	1	0	1	.	.	.	.	.	7.3060	1.91290	122.308	1998.98	1132.43
55	883	110	1903.1	130	84.4	5427	156	19.3	0	0	1	1	.	.	.	.	.	7.6232	1.92752	122.973	2046.06	1189.21
56	884	110	1920.7	130	85.0	5533	157	19.5	0	0	0	1	.	.	.	.	.	7.5709	1.96588	124.936	2108.41	1188.63
57	891	110	1938.5	130	85.6	5640	157	19.8	1	0	0	1	.	.	.	.	.	7.7097	1.96669	128.514	2141.73	1210.43
58	892	110	1956.4	130	86.0	5750	158	20.0	0	1	0	1	.	.	.	.	.	7.9653	2.01753	124.789	2219.28	1258.51
59	893	110	1974.5	130	86.6	5861	159	20.2	0	0	1	1	.	.	.	.	.	8.2910	2.03460	125.711	2260.44	1318.26
60	894	110	1992.8	130	87.1	5975	160	20.5	0	0	0	1	.	.	.	.	.	8.2456	2.07215	127.647	2336.35	1319.29
61	901	110	2011.2	130	87.6	6084	160	20.7	1	0	0	1	.	.	.	.	.	8.3749	2.07312	131.321	2360.24	1339.99
62	902	110	2029.8	130	88.0	6195	161	21.0	0	1	0	1	.	.	.	.	.	8.6382	2.12373	127.493	2452.90	1390.75
63	903	110	2048.6	130	88.5	6308	162	21.3	0	0	1	1	.	.	.	.	.	8.9659	2.13966	128.292	2506.61	1452.48
64	904	110	2067.5	130	88.9	6423	163	21.5	0	0	0	1	.	.	.	.	.	8.9102	2.17731	130.308	2574.67	1452.36
65	911	110	2086.6	130	89.4	6540	163	21.8	1	0	0	1	.	.	.	.	.	9.0529	2.17843	133.989	2611.93	1475.63
66	912	110	2105.9	130	89.8	6660	164	22.0	0	1	0	1	.	.	.	.	.	9.3191	2.23058	130.400	2699.01	1528.33
67	913	110	2125.4	130	90.2	6781	165	22.3	0	0	1	1	.	.	.	.	.	9.6480	2.24638	131.280	2755.18	1591.92
68	914	110	2145.0	130	90.7	6905	166	22.6	0	0	0	1	.	.	.	.	.	9.6130	2.28520	133.353	2840.50	1595.76
69	921	110	2164.9	130	91.1	7031	166	22.9	1	0	0	1	.	.	.	.	.	9.7579	2.28628	137.129	2879.58	1619.81
70	922	110	2184.9	130	91.6	7159	167	23.1	0	1	0	1	.	.	.	.	.	10.0382	2.34022	133.688	2973.25	1676.39
71	923	110	2205.1	130	92.0	7290	168	23.4	0	0	1	1	.	.	.	.	.	10.3765	2.35695	134.716	3033.39	1743.25
72	924	110	2225.5	130	92.5	7423	169	23.7	0	0	0	1	.	.	.	.	.	10.3502	2.39670	136.918	3124.10	1749.18
73	931	110	.	130	.	.	.	.	1	0	0	1	.	.	.	.	.	.	.	.	.	.
74	932	110	.	130	.	.	.	.	0	1	0	1	.	.	.	.	.	.	.	.	.	.
75	933	110	.	130	.	.	.	.	0	0	1	1	.	.	.	.	.	.	.	.	.	.

FORHIGRO-FORECAST VARIABLES FOR HIGH GROWTH NATIONAL MODEL

OBS	QTR	AVEDIST	GNP72	OTC	FUELAD	NTAKEOFF	ADF	AVESEATS	DUM1	DUM2	DUM3	DEREG	RPT1	ATOPS	FARE	SEATMI	RPTDIST	PRPT1	PATOPS	PFARE	PSEATMI	PRPTDIST
76	934	110	.	130	.	.	.	.	0	0	0	1	.	.	.	.	.	.	.	.	.	.
77	941	110	.	130	.	.	.	.	1	0	0	1	.	.	.	.	.	.	.	.	.	.
78	942	110	.	130	.	.	.	.	0	1	0	1	.	.	.	.	.	.	.	.	.	.
79	943	110	.	130	.	.	.	.	0	0	1	1	.	.	.	.	.	.	.	.	.	.
80	944	110	.	130	.	.	.	.	0	0	0	1	.	.	.	.	.	.	.	.	.	.

FORHIGRO-FORECAST HIGH GROWTH PREDICTIONS FOR NATIONAL MODEL

OBS	QTR	FARE	RPTDIST	RPT1	ATOPS	SEATMI	PRPT1	PATOPS	PFARE	PSEATMI	PRPTDIST
1	751	95.28	141.562	1.19752	0.502801	326.022	1.22159	0.49253	96.199	308.24	145.42
2	752	94.01	152.956	1.30907	0.490517	356.008	1.35432	0.51329	93.681	387.53	160.40
3	753	96.80	170.555	1.47982	0.509153	358.317	1.45143	0.49533	96.211	337.03	165.76
4	754	95.57	151.019	1.27764	0.533248	374.703	1.29402	0.54142	95.452	389.53	153.10
5	761	96.72	151.142	1.28891	0.531816	377.656	1.27694	0.52832	96.955	369.75	148.67
6	762	97.12	169.944	1.47466	0.547389	369.845	1.43301	0.54468	97.111	374.09	163.90
7	763	99.02	186.983	1.63164	0.557751	370.102	1.62593	0.54373	98.909	354.17	186.13
8	764	100.07	166.834	1.43850	0.577412	365.176	1.37751	0.56167	99.623	351.01	157.24
9	771	98.64	178.052	1.49949	0.556343	371.284	1.46001	0.59235	98.356	411.74	173.28
10	772	98.40	204.056	1.75497	0.644299	425.822	1.78468	0.62046	100.434	380.12	207.87
11	773	97.47	237.553	1.96570	0.665959	409.173	2.04173	0.67652	97.596	427.31	248.94
12	774	97.67	221.659	1.83373	0.664393	462.090	1.82926	0.67425	97.331	466.28	221.84
13	781	100.47	228.494	1.88312	0.670160	426.916	1.88436	0.66669	99.382	436.32	228.25
14	782	97.60	262.879	2.17471	0.712879	457.312	2.21249	0.72880	94.852	489.14	268.52
15	783	94.83	292.548	2.43052	0.697318	447.562	2.40777	0.72020	95.895	470.84	289.97
16	784	93.07	247.165	2.05692	0.731737	582.045	2.07506	0.72051	94.123	565.15	249.62
17	791	91.63	269.686	2.11232	0.808387	638.348	2.13847	0.78962	91.849	614.18	273.31
18	792	90.75	373.994	2.83910	0.925830	701.253	2.76802	0.91367	91.802	679.36	363.14
19	793	94.19	425.557	3.23971	0.962300	739.659	3.22053	0.95671	93.699	735.46	422.40
20	794	99.16	377.819	2.84554	0.980886	763.992	2.87648	0.98982	99.010	776.03	382.70
21	801	.	.	.	.	.	.	.	.	.	.
22	802	.	.	.	.	.	.	.	.	.	.
23	803	.	.	.	.	.	.	.	.	.	.
24	804	.	.	.	.	.	.	.	.	.	.
25	811	.	.	.	.	.	3.14199	1.17045	113.498	920.56	414.74
26	812	.	.	.	.	.	3.34606	1.21527	109.377	962.49	445.03
27	813	.	.	.	.	.	3.62265	1.22591	109.706	984.40	485.43
28	814	.	.	.	.	.	3.51682	1.25837	111.266	1017.39	474.77
29	821	.	.	.	.	.	3.58519	1.26572	113.838	1030.30	487.59
30	822	.	.	.	.	.	3.84453	1.30890	110.672	1079.85	522.86
31	823	.	.	.	.	.	4.09565	1.31801	110.984	1094.60	561.10
32	824	.	.	.	.	.	4.00309	1.35079	112.528	1136.69	552.43
33	831	.	.	.	.	.	4.09539	1.34897	115.855	1142.58	565.16
34	832	.	.	.	.	.	4.31787	1.39541	111.739	1197.26	600.18
35	833	.	.	.	.	.	4.60076	1.40857	112.319	1216.30	644.11
36	834	.	.	.	.	.	4.51223	1.44477	113.948	1255.50	636.22
37	841	.	.	.	.	.	4.61635	1.45257	116.382	1278.26	655.52
38	842	.	.	.	.	.	4.85530	1.49420	113.339	1323.12	689.45
39	843	.	.	.	.	.	5.15115	1.50827	113.858	1352.16	736.61
40	844	.	.	.	.	.	5.07851	1.54658	115.643	1395.01	731.31
41	851	.	.	.	.	.	5.19367	1.55625	118.160	1420.86	753.08
42	852	.	.	.	.	.	5.43806	1.59533	115.223	1474.08	788.52
43	853	.	.	.	.	.	5.73745	1.61116	115.975	1497.57	837.67
44	854	.	.	.	.	.	5.67768	1.64945	117.772	1551.31	834.62
45	861	.	.	.	.	.	5.78914	1.65841	120.614	1568.85	856.79
46	862	.	.	.	.	.	6.03919	1.70722	116.944	1633.81	899.84
47	863	.	.	.	.	.	6.34333	1.71918	117.904	1664.17	951.50
48	864	.	.	.	.	.	6.28906	1.74950	120.878	1703.14	943.36
49	871	.	.	.	.	.	6.40836	1.75866	123.568	1731.40	967.66
50	872	.	.	.	.	.	6.66670	1.80969	119.865	1801.55	1013.34
51	873	.	.	.	.	.	6.98360	1.82403	120.556	1845.92	1068.49
52	874	.	.	.	.	.	6.93253	1.86217	122.578	1905.00	1067.61
53	881	.	.	.	.	.	7.05230	1.86192	126.132	1925.23	1086.05
54	882	.	.	.	.	.	7.30601	1.91290	122.308	1998.98	1132.43
55	883	.	.	.	.	.	7.62316	1.92752	122.973	2046.06	1189.21
56	884	.	.	.	.	.	7.57089	1.96588	124.936	2108.41	1188.63

FORHIGRO-FORECAST HIGH GROWTH PREDICTIONS FOR NATIONAL MODEL

OBS	QTR	FARE	RPTDIST	RPT1	ATOPS	SEATMI	PRPT1	PATOPS	PFARE	PSEATMI	PRPTDIST
57	891	.	.	.	.	.	7.7097	1.96669	128.514	2141.73	1210.43
58	892	.	.	.	.	.	7.9653	2.01753	124.789	2219.28	1258.51
59	893	.	.	.	.	.	8.2910	2.03460	125.711	2260.44	1318.26
60	894	.	.	.	.	.	8.2456	2.07215	127.647	2336.35	1319.29
61	901	.	.	.	.	.	8.3749	2.07312	131.321	2360.24	1339.99
62	902	.	.	.	.	.	8.6382	2.12373	127.493	2452.90	1390.75
63	903	.	.	.	.	.	8.9659	2.13966	128.292	2506.61	1452.48
64	904	.	.	.	.	.	8.9102	2.17731	130.308	2574.67	1452.36
65	911	.	.	.	.	.	9.0529	2.17843	133.989	2611.93	1475.63
66	912	.	.	.	.	.	9.3191	2.23058	130.400	2699.01	1528.33
67	913	.	.	.	.	.	9.6480	2.24638	131.280	2755.18	1591.92
68	914	.	.	.	.	.	9.6130	2.28520	133.353	2840.50	1595.76
69	921	.	.	.	.	.	9.7579	2.28628	137.129	2879.58	1619.81
70	922	.	.	.	.	.	10.0382	2.34022	133.688	2973.25	1676.39
71	923	.	.	.	.	.	10.3765	2.35695	134.716	3033.39	1743.25
72	924	.	.	.	.	.	10.3502	2.39670	136.918	3124.10	1749.18
73	931	.	.	.	.	.	.	.	.	.	.
74	932	.	.	.	.	.	.	.	.	.	.
75	933	.	.	.	.	.	.	.	.	.	.
76	934	.	.	.	.	.	.	.	.	.	.
77	941	.	.	.	.	.	.	.	.	.	.
78	942	.	.	.	.	.	.	.	.	.	.
79	943	.	.	.	.	.	.	.	.	.	.
80	944	.	.	.	.	.	.	.	.	.	.

ANNUALIZED FORECAST
HIGH GROWTH

OBS	YR	ASM	RPM	ENP	OPS	FRC_ASM	FRC_RPM	FRC_ENP	FRC_OPS
1	75	1415.05	616.09	5.2641	2.03572	1422.3	624.67	5.3214	2.04257
2	76	1482.78	674.90	5.8337	2.21437	1449.0	655.95	5.7134	2.17840
3	77	1668.37	841.32	7.0539	2.53099	1685.4	851.94	7.1157	2.56358
4	78	1913.83	1031.09	8.5453	2.81209	1961.5	1036.35	8.5797	2.83620
5	79	2843.25	1447.06	11.0367	3.67740	2805.0	1441.55	11.0035	3.64982
6	80	.	.	.	.	.	.	.	.
7	81	.	.	.	.	3884.8	1819.97	13.6275	4.86999
8	82	.	.	.	.	4341.4	2123.97	15.5285	5.24342
9	83	.	.	.	.	4811.6	2445.68	17.5262	5.59772
10	84	.	.	.	.	5348.6	2812.89	19.7013	6.00162
11	85	.	.	.	.	5943.8	3213.89	22.0469	6.41219
12	86	.	.	.	.	6570.0	3651.49	24.4607	6.83430
13	87	.	.	.	.	7283.9	4117.10	26.9912	7.25455
14	88	.	.	.	.	8078.7	4596.33	29.5524	7.66822
15	89	.	.	.	.	8957.8	5106.50	32.2116	8.09097
16	90	.	.	.	.	9894.4	5635.58	34.8892	8.51382
17	91	.	.	.	.	10906.6	6191.63	37.6330	8.94059
18	92	.	.	.	.	12010.3	6788.63	40.5228	9.38016
19	93	.	.	.	.	.	.	.	.
20	94	.	.	.	.	.	.	.	.

ANNUALIZED FORECAST
CONCENSUS GROWTH

OBS	YR	ASM	RPM	ENP	OPS	FRC_ASM	FRC_RPM	FRC_ENP	FRC_OPS	LOAD_FAC	PLOAD	BF	PBF
1	75	1415.05	616.09	5.2641	2.03572	1422.3	624.67	5.3214	2.04257	0.435386	0.439191	5.17169	5.21044
2	76	1482.78	674.90	5.8337	2.21437	1449.0	655.95	5.7134	2.17840	0.455161	0.452685	5.26896	5.24549
3	77	1668.37	841.32	7.0539	2.53099	1685.4	851.94	7.1157	2.56358	0.504277	0.505467	5.57401	5.55135
4	78	1913.83	1031.09	8.5453	2.81209	1961.5	1036.35	8.5797	2.83620	0.538754	0.528358	6.07751	6.05012
5	79	2843.25	1447.06	11.0367	3.67740	2805.0	1441.55	11.0035	3.64982	0.508944	0.513915	6.00243	6.02961
6	80	.	.	.	.	.	.	.	.	.	.	.	.
7	81	.	.	.	.	3863.7	1803.25	13.5022	4.84333	.	0.466722	.	5.57558
8	82	.	.	.	.	4328.9	2101.44	15.3638	5.22833	.	0.485439	.	5.87714
9	83	.	.	.	.	4778.0	2396.07	17.1713	5.55863	.	0.501485	.	6.17824
10	84	.	.	.	.	5260.6	2713.67	19.0068	5.90311	.	0.515847	.	6.43959
11	85	.	.	.	.	5788.2	3050.44	20.9262	6.24446	.	0.527012	.	6.70232
12	86	.	.	.	.	6359.4	3421.30	22.9190	6.61529	.	0.537996	.	6.92910
13	87	.	.	.	.	7013.6	3817.37	25.0266	6.98548	.	0.544283	.	7.16532
14	88	.	.	.	.	7748.4	4239.23	27.2565	7.35484	.	0.547109	.	7.41185
15	89	.	.	.	.	8562.5	4694.29	29.6115	7.73398	.	0.548240	.	7.65751
16	90	.	.	.	.	9430.0	5171.75	32.0177	8.11426	.	0.548436	.	7.89172
17	91	.	.	.	.	10364.9	5676.16	34.4999	8.49657	.	0.547634	.	8.12091
18	92	.	.	.	.	11382.6	6217.55	37.1140	8.88997	.	0.546233	.	8.34962
19	93	.	.	.	.	.	.	.	.	.	.	.	.
20	94	.	.	.	.	.	.	.	.	.	.	.	.

HAWAII

FORHAWAI-FORECAST VARIABLES FOR HAWAII MODEL

OBS	QTR	ADF	AVESEATS	DISINC	DUM1	DUM2	DUM3	RPT1	ATOPS	RPTDIST	SEATMI	PRPT1	PATOPS	PRPTDIST	PSEATMI
1	751	79.9475	4.62264	3.9115	1	0	0	0.038716	0.022792	3.09525	7.1297	.	.	.	.
2	752	80.2878	4.62013	3.9945	0	1	0	0.042081	0.022868	3.37859	7.1851	.	.	.	.
3	753	83.5277	4.58444	3.9940	0	0	1	0.050912	0.024966	4.25256	7.8703	.	.	.	.
4	754	83.6636	4.60689	4.0012	0	0	0	0.046251	0.024464	3.86953	8.4378	.	.	.	.
5	761	83.8778	4.59801	4.0331	1	0	0	0.048780	0.027211	4.09156	8.5685	.	.	.	.
6	762	83.3413	4.63439	4.0572	0	1	0	0.049758	0.029147	4.14690	8.0889	.	.	.	.
7	763	84.8842	4.56185	4.0955	0	0	1	0.060225	0.024966	5.11215	9.1568	.	.	.	.
8	764	85.4723	4.49492	4.1223	0	0	0	0.061341	0.031667	5.24295	10.3136	.	.	.	.
9	771	84.3072	4.49324	4.1441	1	0	0	0.064961	0.034230	5.47668	10.2037	.	.	.	.
10	772	84.0217	4.48390	4.1525	0	1	0	0.068957	0.031341	5.79388	10.3439	.	.	.	.
11	773	83.5076	4.47579	4.2049	0	0	1	0.055952	0.035662	4.67242	10.4370	.	.	.	.
12	774	82.5354	4.04253	4.2424	0	0	0	0.055162	0.034441	4.55281	8.5665	.	.	.	.
13	781	82.6520	4.18160	4.2810	1	0	0	0.070461	0.041796	5.38720	9.0809	.	.	.	.
14	782	89.7813	4.32550	4.2773	0	1	0	0.082001	0.041626	6.37450	10.4419	.	.	.	.
15	783	90.9198	4.47430	4.2998	0	0	1	0.095432	0.059411	7.54270	11.1934	.	.	.	.
16	784	88.2026	4.62835	4.3080	0	0	0	0.101187	0.056929	8.92496	11.4950	.	.	.	.
17	791	87.5143	4.61654	4.3088	1	0	0	0.087142	0.056406	7.62617	11.5600	0.083638	0.052940	7.9362	11.5793
18	792	85.1269	4.59127	4.3115	0	1	0	0.088311	0.053173	7.51764	10.9392	0.085324	0.050142	7.4175	10.8851
19	793	86.5318	4.57576	4.3205	0	0	1	0.090857	0.058995	7.86202	10.7013	0.087861	0.054074	7.6251	11.1903
20	794	87.7017	4.40027	4.3277	0	0	0	0.078600	0.051963	6.89335	11.3180	0.084422	0.046598	7.3959	11.2946
21	801	.	.	.	.	.	.	.	.	.	.	.	.	.	.
22	802	.	.	.	.	.	.	.	.	.	.	.	.	.	.
23	803	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24	804	.	.	.	.	.	.	.	.	.	.	.	.	.	.
25	811	89.0000	4.60000	4.4630	1	0	0	.	.	.	.	0.102902	0.063366	9.1583	12.9710
26	812	89.0000	4.60000	4.4910	0	1	0	.	.	.	.	0.107749	0.062965	9.5896	12.8890
27	813	89.0000	4.60000	4.5190	0	0	1	.	.	.	.	0.112660	0.068440	10.0267	14.0097
28	814	89.0000	4.60000	4.5470	0	0	0	.	.	.	.	0.111819	0.068288	9.9519	13.9785
29	821	90.0000	4.70000	4.5750	1	0	0	.	.	.	.	0.116894	0.072482	10.5205	15.3300
30	822	90.0000	4.70000	4.6030	0	1	0	.	.	.	.	0.121741	0.072082	10.9567	15.2453
31	823	90.0000	4.70000	4.6320	0	0	1	.	.	.	.	0.126777	0.077639	11.4100	16.4207
32	824	90.0000	4.70000	4.6600	0	0	0	.	.	.	.	0.125937	0.077487	11.3343	16.3884
33	831	90.5000	4.80000	4.6890	1	0	0	.	.	.	.	0.131137	0.081764	11.8679	17.7591
34	832	90.5000	4.80000	4.7180	0	1	0	.	.	.	.	0.136108	0.081446	12.3178	17.6901
35	833	90.5000	4.80000	4.7480	0	0	1	.	.	.	.	0.141269	0.087086	12.7849	18.9151
36	834	90.5000	4.80000	4.7770	0	0	0	.	.	.	.	0.140554	0.087016	12.7201	18.8998
37	841	91.0000	4.90000	4.8070	1	0	0	.	.	.	.	0.145878	0.091375	13.2749	20.3722
38	842	91.0000	4.90000	4.8360	0	1	0	.	.	.	.	0.150850	0.091058	13.7274	20.3013
39	843	91.0000	4.90000	4.8660	0	0	1	.	.	.	.	0.156011	0.096698	14.1970	21.5587
40	844	91.0000	4.90000	4.8960	0	0	0	.	.	.	.	0.155421	0.096710	14.1433	21.5614
41	851	91.5000	5.00000	4.9270	1	0	0	.	.	.	.	0.160870	0.101152	14.7196	23.1385
42	852	91.5000	5.00000	4.9570	0	1	0	.	.	.	.	0.165967	0.100917	15.1860	23.0847
43	853	91.5000	5.00000	4.9880	0	0	1	.	.	.	.	0.171253	0.106639	15.6696	24.3937
44	854	91.5000	5.00000	5.0190	0	0	0	.	.	.	.	0.170787	0.106734	15.6270	24.4153
45	861	92.0000	5.10000	5.0500	1	0	0	.	.	.	.	0.176237	0.111176	16.2138	26.0819
46	862	92.0000	5.10000	5.0810	0	1	0	.	.	.	.	0.181458	0.111023	16.6942	26.0460
47	863	92.0000	5.10000	5.1120	0	0	1	.	.	.	.	0.186744	0.116745	17.1805	27.3885
48	864	92.0000	5.10000	5.1440	0	0	0	.	.	.	.	0.186404	0.116923	17.1491	27.4300
49	871	92.5000	5.20000	5.1760	1	0	0	.	.	.	.	0.191978	0.121447	17.7560	29.2081
50	872	92.5000	5.20000	5.2080	0	1	0	.	.	.	.	0.197325	0.121377	18.2525	29.1911
51	873	92.5000	5.20000	5.2400	0	0	1	.	.	.	.	0.202736	0.127182	18.7530	30.5872
52	874	92.5000	5.20000	5.2730	0	0	0	.	.	.	.	0.202520	0.127441	18.7331	30.6497
53	881	93.0000	5.30000	5.3050	1	0	0	.	.	.	.	0.208094	0.131966	19.3528	32.5231
54	882	93.0000	5.30000	5.3380	0	1	0	.	.	.	.	0.213566	0.131978	19.8616	32.5260
55	883	93.0000	5.30000	5.3710	0	0	1	.	.	.	.	0.219102	0.137866	20.3765	33.9770
56	884	93.0000	5.30000	5.4050	0	0	0	.	.	.	.	0.219011	0.138208	20.3680	34.0613

FURHAWAI-FORECAST VARIABLES FOR HAWAII MODEL

OBS	QTR	ADF	AVESEATS	DISINC	DUM1	DUM2	DUM3	RPT1	ATOPS	RPTDIST	SEATMI	PRPT1	PATOPS	PRPTDIST	PSEATMI
57	891	93.5	5.4	5.438	1	0	0	.	.	.	.	0.224710	0.142815	21.0104	36.0537
58	892	93.5	5.4	5.472	0	1	0	.	.	.	.	0.230307	0.142910	21.5337	36.0775
59	893	93.5	5.4	5.506	0	0	1	.	.	.	.	0.235967	0.148879	22.0630	37.5846
60	894	93.5	5.4	5.540	0	0	0	.	.	.	.	0.235876	0.149222	22.0544	37.6710
61	901	94.0	5.6	5.574	1	0	0	.	.	.	.	0.241701	0.153790	22.7199	40.4774
62	902	94.0	5.6	5.608	0	1	0	.	.	.	.	0.247297	0.153884	23.2459	40.5023
63	903	94.0	5.6	5.643	0	0	1	.	.	.	.	0.253083	0.159936	23.7898	42.0953
64	904	94.0	5.6	5.678	0	0	0	.	.	.	.	0.253117	0.160361	23.7930	42.2070
65	911	94.5	5.7	5.713	1	0	0	.	.	.	.	0.259066	0.165133	24.4818	44.4745
66	912	94.5	5.7	5.749	0	1	0	.	.	.	.	0.264913	0.165393	25.0342	44.5444
67	913	94.5	5.7	5.784	0	0	1	.	.	.	.	0.270698	0.171445	25.5810	46.1745
68	914	94.5	5.7	5.820	0	0	0	.	.	.	.	0.270857	0.171952	25.5960	46.3110
69	921	95.0	5.8	5.856	1	0	0	.	.	.	.	0.276932	0.176807	26.3085	48.7103
70	922	95.0	5.8	5.892	0	1	0	.	.	.	.	0.282778	0.177066	26.8639	48.7818
71	923	95.0	5.8	5.929	0	0	1	.	.	.	.	0.288813	0.183284	27.4373	50.4947
72	924	95.0	5.8	5.966	0	0	0	.	.	.	.	0.289097	0.183873	27.4642	50.6571

FORHAWAI-FORECAST VARIABLES FOR HAWAII MODEL

OBS	QTR	ADF	AVESEATS	DISINC	DUM1	DUM2	DUM3	RPTI	ATOPS	RPTDIST	SEATHI	PRPTI	PATOPS	PRPTDIST	PSEAT
1	751	79.9475	4.62264	3.9115	1	0	0	0.038716	0.022792	3.09525	7.1297	.	.	.	.
2	752	80.2878	4.62013	3.9945	0	1	0	0.042081	0.022868	3.37859	7.1851	.	.	.	.
3	753	83.5277	4.58444	3.9940	0	0	1	0.050912	0.024966	4.25256	7.8703	.	.	.	.
4	754	83.6636	4.60689	4.0012	0	0	0	0.046251	0.024464	3.86953	8.4378	.	.	.	.
5	761	83.8778	4.59801	4.0331	1	0	0	0.048780	0.027211	4.09156	8.5685	.	.	.	.
6	762	83.3413	4.63439	4.0572	0	1	0	0.049758	0.029147	4.14690	8.0889	.	.	.	.
7	763	84.8842	4.56185	4.0955	0	0	1	0.060225	0.024966	5.11215	9.1568	.	.	.	.
8	764	85.4723	4.49492	4.1223	0	0	0	0.061341	0.031667	5.24295	10.3136	.	.	.	.
9	771	84.3072	4.49324	4.1441	1	0	0	0.064961	0.034230	5.47668	10.2037	.	.	.	.
10	772	84.0217	4.48390	4.1525	0	1	0	0.068957	0.031341	5.79388	10.3459	.	.	.	.
11	773	83.5076	4.47579	4.2049	0	0	1	0.055952	0.035662	4.67242	10.4370	.	.	.	.
12	774	82.5354	4.04253	4.2424	0	0	0	0.055162	0.034441	4.55231	8.5665	.	.	.	.
13	781	82.6520	4.18160	4.2810	1	0	0	0.070461	0.041796	5.38720	9.0809	.	.	.	.
14	782	89.7813	4.32550	4.2773	0	1	0	0.082001	0.041626	6.37450	10.4419	.	.	.	.
15	783	90.9198	4.47430	4.2998	0	0	1	0.095432	0.059411	7.54270	11.1934	.	.	.	.
16	784	88.2026	4.62835	4.3080	0	0	0	0.101187	0.056929	8.92496	11.4950	.	.	.	.
17	791	87.5143	4.61654	4.3088	1	0	0	0.087142	0.056406	7.62617	11.5600	0.083638	0.052940	7.9362	11.57
18	792	85.1269	4.59127	4.3115	0	1	0	0.088311	0.053173	7.51764	10.9392	0.085324	0.050142	7.4175	10.82
19	793	86.5318	4.57576	4.3205	0	0	1	0.090857	0.058995	7.86202	10.7013	0.087861	0.054074	7.6251	11.19
20	794	87.7017	4.40027	4.3277	0	0	0	0.078600	0.051963	6.89335	11.3180	0.084422	0.046598	7.3959	11.25
21	801	.	.	.	.	.	.	.	.	.	.	.	.	.	.
22	802	.	.	.	.	.	.	.	.	.	.	.	.	.	.
23	803	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24	804	.	.	.	.	.	.	.	.	.	.	.	.	.	.
25	811	89.0000	4.60000	4.4630	1	0	0	.	.	.	.	0.102902	0.063366	9.1583	12.97
26	812	89.0000	4.60000	4.4910	0	1	0	.	.	.	.	0.107749	0.062965	9.5896	12.88
27	813	89.0000	4.60000	4.5190	0	0	1	.	.	.	.	0.112660	0.068440	10.0267	14.00
28	814	89.0000	4.60000	4.5470	0	0	0	.	.	.	.	0.111819	0.068288	9.9519	13.97
29	821	90.0000	4.70000	4.5750	1	0	0	.	.	.	.	0.116894	0.072482	10.5205	15.33
30	822	90.0000	4.70000	4.6030	0	1	0	.	.	.	.	0.121741	0.072082	10.9567	15.24
31	823	90.0000	4.70000	4.6320	0	0	1	.	.	.	.	0.126777	0.077639	11.4100	16.42
32	824	90.0000	4.70000	4.6600	0	0	0	.	.	.	.	0.125937	0.077487	11.3343	16.38
33	831	90.5000	4.80000	4.6890	1	0	0	.	.	.	.	0.131137	0.081764	11.8679	17.75
34	832	90.5000	4.80000	4.7180	0	1	0	.	.	.	.	0.136108	0.081446	12.3178	17.69
35	833	90.5000	4.80000	4.7480	0	0	1	.	.	.	.	0.141269	0.087086	12.7849	18.91
36	834	90.5000	4.80000	4.7770	0	0	0	.	.	.	.	0.140554	0.087016	12.7201	18.89
37	841	91.0000	4.90000	4.8070	1	0	0	.	.	.	.	0.145878	0.091375	13.2749	20.37
38	842	91.0000	4.90000	4.8360	0	1	0	.	.	.	.	0.150850	0.091058	13.7274	20.30
39	843	91.0000	4.90000	4.8660	0	0	1	.	.	.	.	0.156011	0.096698	14.1970	21.55
40	844	91.0000	4.90000	4.8960	0	0	0	.	.	.	.	0.155421	0.096710	14.1433	21.56
41	851	91.5000	5.00000	4.9270	1	0	0	.	.	.	.	0.160870	0.101152	14.7196	23.13
42	852	91.5000	5.00000	4.9570	0	1	0	.	.	.	.	0.165967	0.100917	15.1860	23.08
43	853	91.5000	5.00000	4.9880	0	0	1	.	.	.	.	0.171253	0.106639	15.6696	24.39
44	854	91.5000	5.00000	5.0190	0	0	0	.	.	.	.	0.170787	0.106734	15.6270	24.41
45	861	92.0000	5.10000	5.0500	1	0	0	.	.	.	.	0.176237	0.111176	16.2138	26.08
46	862	92.0000	5.10000	5.0810	0	1	0	.	.	.	.	0.181458	0.111023	16.6942	26.04
47	863	92.0000	5.10000	5.1120	0	0	1	.	.	.	.	0.186744	0.116745	17.1805	27.38
48	864	92.0000	5.10000	5.1440	0	0	0	.	.	.	.	0.186404	0.116923	17.1491	27.43
49	871	92.5000	5.20000	5.1760	1	0	0	.	.	.	.	0.191978	0.121447	17.7580	29.20
50	872	92.5000	5.20000	5.2080	0	1	0	.	.	.	.	0.197325	0.121377	18.2525	29.19
51	873	92.5000	5.20000	5.2400	0	0	1	.	.	.	.	0.202736	0.127182	18.7530	30.58
52	874	92.5000	5.20000	5.2730	0	0	0	.	.	.	.	0.202520	0.127441	18.7331	30.64
53	881	93.0000	5.30000	5.3050	1	0	0	.	.	.	.	0.208094	0.131966	19.3528	32.52
54	882	93.0000	5.30000	5.3380	0	1	0	.	.	.	.	0.213566	0.131978	19.8616	32.53
55	883	93.0000	5.30000	5.3710	0	0	1	.	.	.	.	0.219102	0.137866	20.3765	33.97
56	884	93.0000	5.30000	5.4050	0	0	0	.	.	.	.	0.219011	0.138208	20.3680	34.06

FORHAWAI-FORECAST PREDICTIONS FOR HAWAII MODEL

OBS	QIR	RPTI	AIOPS	RPTIDIST	SEAIMI	PRPTI	PAIOPS	PRPTIDIST	PSEAIMI
1	751	0.038716	0.022792	3.09525	7.1297	.	.	.	.
2	752	0.042081	0.022868	3.37859	7.1851	.	.	.	.
3	753	0.050912	0.024966	4.25256	7.8703	.	.	.	.
4	754	0.046251	0.024464	3.86953	8.4378	.	.	.	.
5	761	0.048780	0.027211	4.09156	8.5685	.	.	.	.
6	762	0.049758	0.029147	4.14690	8.0889	.	.	.	.
7	763	0.060225	0.024966	5.11215	9.1568	.	.	.	.
8	764	0.061341	0.031667	5.24295	10.3136	.	.	.	.
9	771	0.064961	0.034230	5.47668	10.2037	.	.	.	.
10	772	0.068957	0.031341	5.79388	10.3439	.	.	.	.
11	773	0.055952	0.035662	4.67242	10.4370	.	.	.	.
12	774	0.055162	0.034441	4.55231	8.5665	.	.	.	.
13	781	0.070461	0.041796	5.38720	9.0809	.	.	.	.
14	782	0.082001	0.041626	6.37450	10.4419	.	.	.	.
15	783	0.095432	0.059411	7.54270	11.1934	.	.	.	.
16	784	0.101187	0.056929	8.92496	11.4950	.	.	.	.
17	791	0.087142	0.056406	7.62617	11.5600	0.083638	0.052940	7.9362	11.5793
18	792	0.088311	0.053[illegible]73	7.51764	10.9392	0.085324	0.050142	7.4175	10.8651
19	793	0.090857	0.058995	7.86202	10.7013	0.087861	0.054074	7.6251	11.1903
20	794	0.078600	0.051963	6.89335	11.3180	0.084422	0.046598	7.3959	11.2946
21	801	.	.	.	.	.	.	.	.
22	802	.	.	.	.	.	.	.	.
23	803	.	.	.	.	.	.	.	.
24	804	.	.	.	.	.	.	.	.
25	811	.	.	.	.	0.102902	0.063366	9.1583	12.9710
26	812	.	.	.	.	0.107749	0.062965	9.5896	12.8890
27	813	.	.	.	.	0.112660	0.068440	10.0267	14.0097
28	814	.	.	.	.	0.111819	0.068288	9.9519	13.9785
29	821	.	.	.	.	0.116894	0.072482	10.5205	15.3300
30	822	.	.	.	.	0.121741	0.072082	10.9567	15.2453
31	823	.	.	.	.	0.126777	0.077639	11.4100	16.4207
32	824	.	.	.	.	0.125937	0.077487	11.3343	16.3884
33	831	.	.	.	.	0.131137	0.081764	11.8679	17.7591
34	832	.	.	.	.	0.136108	0.081446	12.3178	17.6901
35	833	.	.	.	.	0.141269	0.087086	12.7849	18.9151
36	834	.	.	.	.	0.140554	0.087016	12.7201	18.8998
37	841	.	.	.	.	0.145878	0.091375	13.2749	20.3722
38	842	.	.	.	.	0.150850	0.091058	13.7274	20.3013
39	843	.	.	.	.	0.156011	0.096698	14.1970	21.5587
40	844	.	.	.	.	0.155421	0.096710	14.1433	21.5614
41	851	.	.	.	.	0.160870	0.101152	14.7196	23.1385
42	852	.	.	.	.	0.165967	0.100917	15.1860	23.0847
43	853	.	.	.	.	0.171253	0.106639	15.6696	24.3937
44	854	.	.	.	.	0.170787	0.106734	15.6270	24.4153
45	861	.	.	.	.	0.176237	0.111176	16.2138	26.0819
46	862	.	.	.	.	0.181458	0.111023	16.6942	26.0460
47	863	.	.	.	.	0.186744	0.116745	17.1805	27.3885
48	864	.	.	.	.	0.186404	0.116923	17.1491	27.4300
49	871	.	.	.	.	0.191978	0.121447	17.7580	29.2081
50	872	.	.	.	.	0.197325	0.121377	18.2525	29.1911
51	873	.	.	.	.	0.202736	0.127182	18.7530	30.5872
52	874	.	.	.	.	0.202520	0.127441	18.7331	30.6497
53	881	.	.	.	.	0.208094	0.131966	19.3528	32.5231
54	882	.	.	.	.	0.213566	0.131978	19.8616	32.5260
55	883	.	.	.	.	0.219102	0.137866	20.3765	33.9770
56	884	.	.	.	.	0.219011	0.138208	20.3680	34.0613

FORHAWAI-FORECAST PREDICTIONS FOR HAWAII MODEL

OBS	QTR	RPTI	ATOPS	RPIDIST	SEATMI	PRPTI	PATOPS	PRPIDIST	PSEATMI
57	891	.	.	.	.	0.224710	0.142815	21.0104	36.0537
58	892	.	.	.	.	0.230307	0.142910	21.5337	36.0775
59	893	.	.	.	.	0.235967	0.148879	22.0630	37.5846
60	894	.	.	.	.	0.235876	0.149222	22.0544	37.6710
61	901	.	.	.	.	0.241701	0.153790	22.7199	40.4774
62	902	.	.	.	.	0.247297	0.153884	23.2459	40.5023
63	903	.	.	.	.	0.253083	0.159936	23.7898	42.0953
64	904	.	.	.	.	0.253117	0.160361	23.7930	42.2070
65	911	.	.	.	.	0.259066	0.165133	24.4818	44.4745
66	912	.	.	.	.	0.264913	0.165393	25.0342	44.5444
67	913	.	.	.	.	0.270698	0.171445	25.5810	46.1745
68	914	.	.	.	.	0.270857	0.171952	25.5960	46.3110
69	921	.	.	.	.	0.276932	0.176807	26.3085	48.7103
70	922	.	.	.	.	0.282778	0.177066	26.8639	48.7818
71	923	.	.	.	.	0.288813	0.183284	27.4373	50.4947
72	924	.	.	.	.	0.289097	0.183873	27.4642	50.6571

PUERTO RICO
AND THE
VIRGIN ISLANDS

FORPURVI FORECAST VARIABLES FOR PUERTO RICO-VIRGIN ISLANDS MODEL

OBS	QTR	AVEDIST	AVESEATS	TOTINC	ADF	DUM1	DUM2	DUM3	RPT1	ATOPS	RPTDIST	SEATMI	PRPT1	PATOPS	PRPTDIST	PSEATMI
1	751	65.9896	15.6337	17.0105	63.7416	1	0	0	0.340831	0.066341	21.7251	41.5223	.	.	.	.
2	752	65.6470	15.5553	17.2651	62.8020	0	1	0	0.306089	0.063680	19.2230	40.4757	.	.	.	.
3	753	65.8703	15.3844	17.4211	64.5705	0	0	1	0.320662	0.061427	20.7053	42.5648	.	.	.	.
4	754	67.7473	15.5259	17.6206	65.4064	0	0	0	0.316579	0.062458	20.7063	43.7838	.	.	.	.
5	761	68.8445	15.2917	17.9272	65.4794	1	0	0	0.323679	0.064764	21.1943	40.8862	.	.	.	.
6	762	67.8924	15.2406	18.2012	64.6853	0	1	0	0.281883	0.059458	18.2337	40.2801	.	.	.	.
7	763	67.1694	15.1931	18.5003	65.2484	0	0	1	0.300671	0.061347	19.6183	44.5560	.	.	.	.
8	764	67.6481	14.8092	18.7503	65.9712	0	0	0	0.294151	0.058430	19.4055	36.9674	.	.	.	.
9	771	67.7283	14.6440	18.9840	66.6503	1	0	0	0.319715	0.062771	21.3091	37.4623	.	.	.	.
10	772	66.4085	14.7627	19.1533	66.3174	0	1	0	0.303750	0.059518	20.1439	39.6172	.	.	.	.
11	773	66.7031	14.9823	19.4798	67.2421	0	0	1	0.298667	0.060767	20.0830	39.7353	.	.	.	.
12	774	68.0945	15.2231	19.7367	65.9585	0	0	0	0.262988	0.059319	17.3463	40.8253	.	.	.	.
13	781	63.0758	14.3606	20.0017	67.5748	1	0	0	0.335683	0.070494	22.6837	31.5230	.	.	.	.
14	782	64.0737	14.4613	20.0680	63.4096	0	1	0	0.240790	0.049810	15.2684	34.2277	.	.	.	.
15	783	61.9359	14.3465	20.3351	68.4017	0	0	1	0.349354	0.068566	23.8964	32.9733	.	.	.	.
16	784	66.4929	15.3631	20.5329	69.3732	0	0	0	0.313160	0.077075	21.7249	47.8146	.	.	.	.
17	791	67.0380	15.2585	20.7014	65.4187	1	0	0	0.413701	0.078588	27.0638	43.3837	0.360972	0.0798594	24.7674	43.5489
18	792	68.5127	15.2488	20.8750	69.1711	0	1	0	0.361187	0.071986	24.9837	43.7191	0.312878	0.0713896	24.1255	44.8237
19	793	66.7972	14.2935	21.0854	66.5353	0	0	1	0.340663	0.065555	22.6661	36.1933	0.335809	0.0663270	21.3542	36.8471
20	794	69.1905	14.8831	21.2880	65.8256	0	0	0	0.312099	0.066553	20.5441	43.5011	0.313451	0.0666564	20.1714	42.8617
21	801	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
22	802	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
23	803	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24	804	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
25	811	69.0000	15.0000	22.2200	66.0000	1	0	0	.	.	.	.	0.373154	0.0729676	24.6282	43.8024
26	812	69.0000	15.0000	22.4200	66.0000	0	1	0	.	.	.	.	0.325272	0.0652739	21.4680	39.1839
27	813	69.0000	15.0000	22.6100	66.0000	0	0	1	.	.	.	.	0.348039	0.0679544	22.9706	40.7930
28	814	69.0000	15.0000	22.8000	66.0000	0	0	0	.	.	.	.	0.325580	0.0689654	21.4883	41.3999
29	821	69.0000	15.0000	23.0000	66.0000	1	0	0	.	.	.	.	0.379412	0.0740085	25.0412	44.4273
30	822	69.0000	15.0000	23.2000	66.0000	0	1	0	.	.	.	.	0.331529	0.0663148	21.8809	39.8088
31	823	69.0000	15.0000	23.4000	66.0000	0	0	1	.	.	.	.	0.354376	0.0690087	23.3883	41.4259
32	824	69.0000	15.0000	23.6000	66.0000	0	0	0	.	.	.	.	0.331998	0.0700330	21.9119	42.0408
33	831	69.0000	15.0000	23.8100	66.0000	1	0	0	.	.	.	.	0.385909	0.0750895	25.4700	45.0762
34	832	69.0000	15.0000	24.0100	66.0000	0	1	0	.	.	.	.	0.338027	0.0673958	22.3098	40.4577
35	833	69.0000	15.0000	24.2200	66.0000	0	0	1	.	.	.	.	0.360954	0.0701030	23.8230	42.0828
36	834	69.0000	15.0000	24.4300	66.0000	0	0	0	.	.	.	.	0.338656	0.0711407	22.3513	42.7058
37	841	69.0000	15.0000	24.6400	66.0000	1	0	0	.	.	.	.	0.392567	0.0761971	25.9095	45.7411
38	842	69.0000	15.0000	24.8500	66.0000	0	1	0	.	.	.	.	0.344766	0.0685168	22.7545	41.1306
39	843	69.0000	15.0000	25.0700	66.0000	0	0	1	.	.	.	.	0.367773	0.0712373	24.2730	42.7638
40	844	69.0000	15.0000	25.2800	66.0000	0	0	0	.	.	.	.	0.345475	0.0722750	22.8013	43.3867
41	851	69.0000	15.0000	25.5000	66.0000	1	0	0	.	.	.	.	0.399466	0.0773448	26.3648	46.4301
42	852	69.0000	15.0000	25.7200	66.0000	0	1	0	.	.	.	.	0.351745	0.0696778	23.2151	41.8276
43	853	69.0000	15.0000	25.9400	66.0000	0	0	1	.	.	.	.	0.374752	0.0723984	24.7336	43.4607
44	854	69.0000	15.0000	26.1700	66.0000	0	0	0	.	.	.	.	0.352614	0.0734628	23.2725	44.0997
45	861	69.0000	15.0000	26.3900	66.0000	1	0	0	.	.	.	.	0.406606	0.0785325	26.8360	47.1431
46	862	69.0000	15.0000	26.6200	66.0000	0	1	0	.	.	.	.	0.358964	0.0708789	23.6916	42.5486
47	863	69.0000	15.0000	26.8500	66.0000	0	0	1	.	.	.	.	0.382052	0.0736128	25.2154	44.1898
48	864	69.0000	15.0000	27.0800	66.0000	0	0	0	.	.	.	.	0.359914	0.0746772	23.7543	44.8287
49	871	69.0000	15.0000	27.3200	66.0000	1	0	0	.	.	.	.	0.414066	0.0797737	27.3284	47.8881
50	872	69.0000	15.0000	27.5500	66.0000	0	1	0	.	.	.	.	0.366425	0.0721200	24.1840	43.2936
51	873	69.0000	15.0000	27.7900	66.0000	0	0	1	.	.	.	.	0.389593	0.0748672	25.7131	44.9428
52	874	69.0000	15.0000	28.0300	66.0000	0	0	0	.	.	.	.	0.367535	0.0759450	24.2573	45.5898
53	881	69.0000	15.0000	28.2700	66.0000	1	0	0	.	.	.	.	0.421687	0.0810415	27.8314	48.6492
54	882	69.0000	15.0000	28.5200	66.0000	0	1	0	.	.	.	.	0.374206	0.0734145	24.6976	44.0707
55	883	69.0000	15.0000	28.7600	66.0000	0	0	1	.	.	.	.	0.397374	0.0761617	26.2267	45.7199

FORPURVI-FORECAST VARIABLES FOR PUERTO RICO-VIRGIN ISLANDS MODEL

OBS	QIR	AVEDIST	AVESEATS	TOTINC	ADF	DUM1	DUM2	DUM3	RPT1	ATOPS	RPTDIST	SEATMI	FRPT1	FATOPS	FRPTDIST	PSEATMI
56	884	69	15	29.01	66	0	0	0	.	.	.	.	0.375397	0.0772528	24.7762	46.3749
57	891	69	15	29.26	66	1	0	0	.	.	.	.	0.429629	0.0823626	28.3555	49.4423
58	892	69	15	29.52	66	0	1	0	.	.	.	.	0.382228	0.0747490	25.2270	44.8718
59	893	69	15	29.77	66	0	0	1	.	.	.	.	0.405476	0.0775096	26.7614	46.5290
60	894	69	15	30.03	66	0	0	0	.	.	.	.	0.383579	0.0786141	25.3162	47.1920
61	901	69	15	30.29	66	1	0	0	.	.	.	.	0.437891	0.0837372	28.9008	50.2674
62	902	69	15	30.55	66	0	1	0	.	.	.	.	0.390491	0.0761236	25.7724	45.6970
63	903	69	15	30.81	66	0	0	1	.	.	.	.	0.413819	0.0788975	27.3121	47.3622
64	904	69	15	31.08	66	0	0	0	.	.	.	.	0.392002	0.0800153	25.8721	48.0332
65	911	69	15	31.35	66	1	0	0	.	.	.	.	0.446395	0.0851518	29.4621	51.1166
66	912	69	15	31.62	66	0	1	0	.	.	.	.	0.399074	0.0775515	26.3389	46.5542
67	913	69	15	31.89	66	0	0	1	.	.	.	.	0.422483	0.0803388	27.8839	48.2274
68	914	69	15	32.17	66	0	0	0	.	.	.	.	0.400746	0.0814700	26.4492	48.9064
69	921	69	15	32.45	66	1	0	0	.	.	.	.	0.455219	0.0866198	30.0444	51.9979
70	922	69	15	32.73	66	0	1	0	.	.	.	.	0.407978	0.0790329	26.9266	47.4434
71	923	69	15	33.01	66	0	0	1	.	.	.	.	0.431467	0.0818335	28.4768	49.1246
72	924	69	15	33.29	66	0	0	0	.	.	.	.	0.409730	0.0829646	27.0422	49.8037

AD-A105 112 WILSON-HILL ASSOCIATES INC WASHINGTON DC F/G 1/5
COMMUTER AIRLINE FORECASTS.(U)
MAY 81 H MEDVILLE, C STARRY, G BERNSTEIN DOT-FA79WAI-138
UNCLASSIFIED FAA-APO-81-7 NL

2 OF 2
AD
A105112

END
DATE
FILMED
10 81
DTIC

FORPURVI-FORECAST PREDICTIONS FOR PUERTO RICO-VIRGIN ISLANDS MODEL

OBS	QTR	RPTI	ATOPS	RPTDIST	SEATMI	PRPTI	PATOPS	PRPTDIST	PSEATMI
1	751	0.340831	0.066341	21.7251	41.5223	.	.	.	.
2	752	0.306089	0.063680	19.2230	40.4757	.	.	.	.
3	753	0.320662	0.061427	20.7053	42.5648	.	.	.	.
4	754	0.316579	0.062458	20.7063	43.7838	.	.	.	.
5	761	0.323679	0.064764	21.1943	40.8862	.	.	.	.
6	762	0.281883	0.059458	18.2337	40.2801	.	.	.	.
7	763	0.300671	0.061347	19.6183	44.5560	.	.	.	.
8	764	0.294151	0.058430	19.4055	36.9674	.	.	.	.
9	771	0.319715	0.062771	21.3091	37.4623	.	.	.	.
10	772	0.303750	0.059518	20.1439	39.6172	.	.	.	.
11	773	0.298667	0.060767	20.0830	39.7353	.	.	.	.
12	774	0.262988	0.059319	17.3463	40.8253	.	.	.	.
13	781	0.335683	0.070494	22.6837	31.5230	.	.	.	.
14	782	0.240790	0.049810	15.2684	34.2277	.	.	.	.
15	783	0.349354	0.068566	23.8964	32.9733	.	.	.	.
16	784	0.313160	0.077075	21.7249	47.8146	.	.	.	.
17	791	0.413701	0.078588	27.0638	43.3837	0.360972	0.0798594	24.7674	43.5489
18	792	0.361187	0.071986	24.9837	43.7191	0.312878	0.0713896	24.1255	44.8237
19	793	0.340663	0.065555	22.6661	36.1933	0.335809	0.0663270	21.3542	36.8471
20	794	0.312099	0.066553	20.5441	43.5011	0.313451	0.0666564	20.1714	42.8617
21	801	.	.	.	.	.	.	.	.
22	802	.	.	.	.	.	.	.	.
23	803	.	.	.	.	.	.	.	.
24	804	.	.	.	.	.	.	.	.
25	811	.	.	.	.	0.373154	0.0729676	24.6282	43.8024
26	812	.	.	.	.	0.325272	0.0652739	21.4680	39.1839
27	813	.	.	.	.	0.348039	0.0679544	22.9706	40.7930
28	814	.	.	.	.	0.325580	0.0689654	21.4883	41.3999
29	821	.	.	.	.	0.379412	0.0740085	25.0412	44.4273
30	822	.	.	.	.	0.331529	0.0663148	21.8809	39.8088
31	823	.	.	.	.	0.354376	0.0690087	23.3888	41.4259
32	824	.	.	.	.	0.331998	0.0700330	21.9119	42.0408
33	831	.	.	.	.	0.385909	0.0750895	25.4700	45.0762
34	832	.	.	.	.	0.338027	0.0673958	22.3098	40.4577
35	833	.	.	.	.	0.360954	0.0701030	23.8230	42.0828
36	834	.	.	.	.	0.338656	0.0711407	22.3513	42.7058
37	841	.	.	.	.	0.392567	0.0761971	25.9095	45.7411
38	842	.	.	.	.	0.344766	0.0685168	22.7545	41.1306
39	843	.	.	.	.	0.367773	0.0712373	24.2730	42.7638
40	844	.	.	.	.	0.345475	0.0722750	22.8013	43.3867
41	851	.	.	.	.	0.399466	0.0773448	26.3648	46.4301
42	852	.	.	.	.	0.351745	0.0696778	23.2151	41.8276
43	853	.	.	.	.	0.374752	0.0723984	24.7336	43.4607
44	854	.	.	.	.	0.352614	0.0734628	23.2725	44.0997
45	861	.	.	.	.	0.406606	0.0785325	26.8360	47.1431
46	862	.	.	.	.	0.358964	0.0708789	23.6916	42.5486
47	863	.	.	.	.	0.382052	0.0736128	25.2154	44.1898
48	864	.	.	.	.	0.359914	0.0746772	23.7543	44.8287
49	871	.	.	.	.	0.414066	0.0797737	27.3284	47.8881
50	872	.	.	.	.	0.366425	0.0721200	24.1840	43.2936
51	873	.	.	.	.	0.389593	0.0748672	25.7131	44.9428
52	874	.	.	.	.	0.367535	0.0759450	24.2573	45.5898
53	881	.	.	.	.	0.421687	0.0810415	27.8314	48.6492
54	882	.	.	.	.	0.374206	0.0734145	24.6976	44.0707
55	883	.	.	.	.	0.397374	0.0761617	26.2267	45.7199

FORPURVI-FORECAST PREDICTIONS FOR PUERTO RICO-VIRGIN ISLANDS MODEL

OBS	QTR	RPTI	ATOPS	RPTDIST	SEATMI	PRPTI	PATOPS	PRPTDIST	PSEATMI
56	884	.	.	.	.	0.375397	0.0772528	24.7762	46.3749
57	891	.	.	.	.	0.429629	0.0823626	28.3555	49.4423
58	892	.	.	.	.	0.382228	0.0747490	25.2270	44.8718
59	893	.	.	.	.	0.405476	0.0775096	26.7614	46.5290
60	894	.	.	.	.	0.383579	0.0786141	25.3162	47.1920
61	901	.	.	.	.	0.437891	0.0837372	28.9008	50.2674
62	902	.	.	.	.	0.390491	0.0761236	25.7724	45.6970
63	903	.	.	.	.	0.413819	0.0788975	27.3121	47.3622
64	904	.	.	.	.	0.392002	0.0800153	25.8721	48.0332
65	911	.	.	.	.	0.446395	0.0851518	29.4621	51.1166
66	912	.	.	.	.	0.399074	0.0775515	26.3389	46.5542
67	913	.	.	.	.	0.422483	0.0803388	27.8839	48.2274
68	914	.	.	.	.	0.400746	0.0814700	26.4492	48.9064
69	921	.	.	.	.	0.455219	0.0866198	30.0444	51.9979
70	922	.	.	.	.	0.407978	0.0790329	26.9266	47.4434
71	923	.	.	.	.	0.431467	0.0818335	28.4768	49.1246
72	924	.	.	.	.	0.409730	0.0829646	27.0422	49.8037

APPENDIX C

LOCAL MODEL EVALUATION ADDENDUM

Two of the variables employed in the market forecast model require special comment. These include the distance measurement and the dummy assigned as a measure of competing markets to alternative hubs.

Distance

Previous studies of commuter activity have employed distance as a predictor of community "isolation" and the demand generated for commuter service. But the relationship is not clear; Figure 14 indicates the problem.

The steps correspond to the annual domestic traffic volumes (left scale) by mileage group in 1979.* As can be seen, ridership increases in markets up to 100 miles, then decreases. The relationship between the mileage in a market and commuter traffic is slightly more complex than can be measured by distance directly.

Superimposed on the step-function is a gamma distribution; a statistical approximation to the step function. On the right scale are values of the gamma distribution corresponding to mileage intervals. The gamma distribution achieves its maximum value at approximately 100 miles, and is less for other distances. For the purpose of modeling commuter traffic behavior, the values of the gamma function are interpreted as "likelihood" estimates. That is, commuter carriers have the same "likelihood" of attracting passengers in 35 mile marekts as they do in 160 mile markets (a "likelihood" estimate of 0.095). In either of these markets there is less "likelihood" to attract passengers as there is in 100 mile markets where the estimate is approximately 0.184.

The gamma distribution value has been used in lieu of distance. A positive correlation is expected between traffic and this distribution (GDIST). This was demonstrated in the market forecast model.

*Table 7, Commuter Air Carrier Traffic Statistics, 1979. CAB.

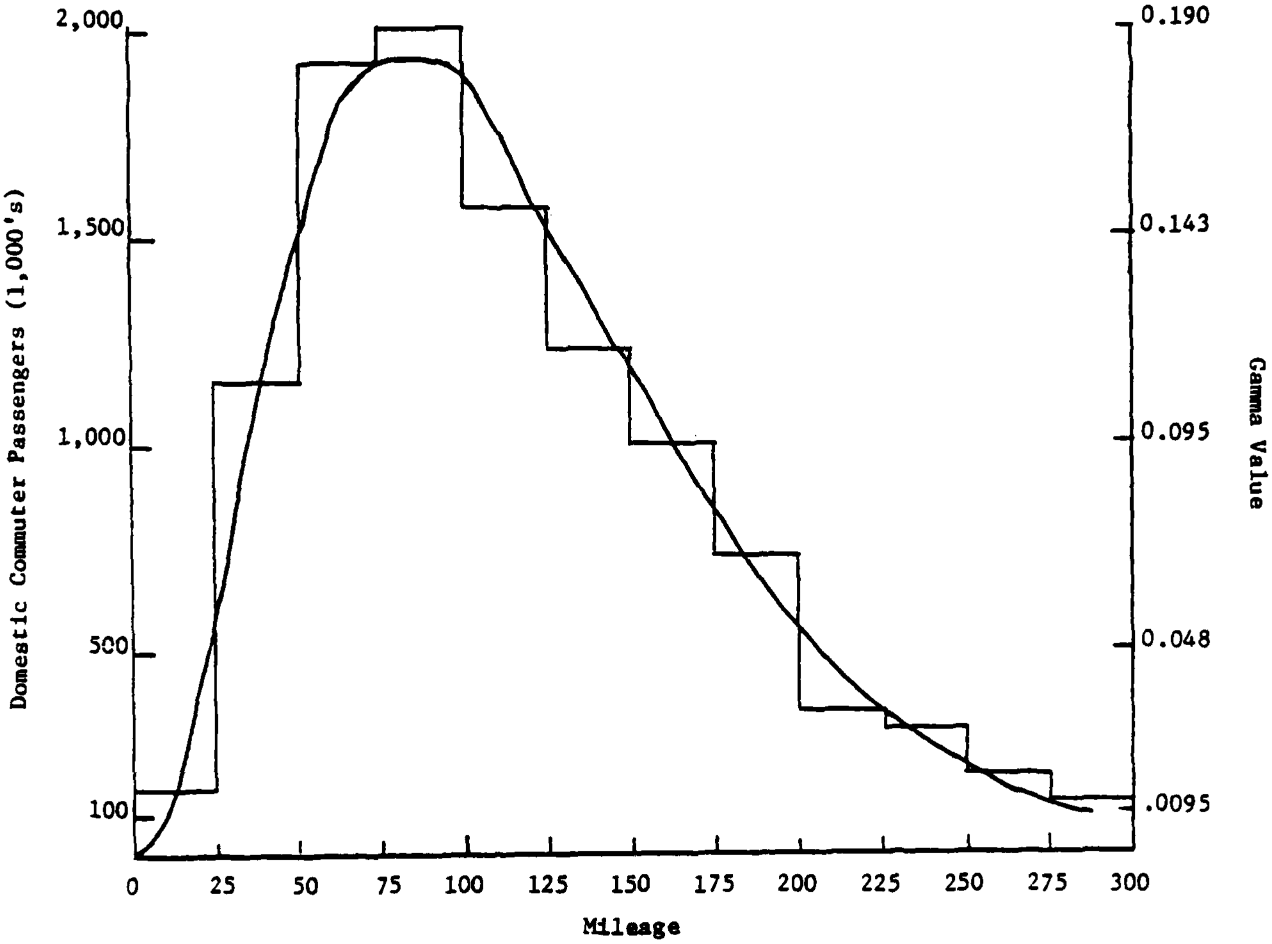

Figure 1 Distribution of commuter passengers by mileage, 1979, and gamma distribution approximation.

Source: CAB data and SRI analysis

Alternatives

The extent to which a passenger has a choice of alternative hubs at which to connect will reduce the traffic in any single market. For example a passenger in Grand Rapids, Minnesota has commuter access to only one hub--Minneapolis/St. Paul. A Fresno, California traveler, in contrast, has access to a choice of hubs, including San Francisco, Los Angeles and Sacramento. We expect the presence of alternate hubs to reduce traffic from what it might be if there were no alternative.

Two dummy variables are introduced to reflect this competition, ALT 1 and ALT 2. Both are assigned a value of zero if no competition appears to exist for the route being examined. If the originating city has comparable access to an equivalent hub or slightly less convenient access to a better hub than is provided on the route being modeled, then ALT 1 is assigned a value of 1 for that route. If hub access is better in another market than on the one modeled, ALT 2 is assigned a value = 1 (ALT 1 = 1, also).

We anticipate the sign of these dummy variables to be negative as traffic will decrease as ALT 1 and ALT 2 increase from 0 to 1.

SAMPLE CITY-PAIRS, MARKET FORECAST MODEL, YEAR AND TRAFFIC

Origin	Destination	Year	Traffic
Abilene	Austin	1978	2,578
"	"	1979	3,319
Abilene	Houston	1977	4,070
"	"	1978	5,489
"	"	1979	7,577
Altoona	Pittsburgh	1975	17,568
"	"	1976	20,822
"	"	1977	23,219
"	"	1978	24,811
"	"	1979	25,679
Walla Walla	Spokane	1975	3,653
"	"	1977	3,762
"	"	1978	4,004
"	"	1979	4,849
Lewiston	Spokane	1977	1,927
"	"	1978	2,402
"	"	1979	4,511
Pasco/Richland	Spokane	1975	2,788
"	"	1977	2,868
"	"	1978	4,767
"	"	1979	5,938
Pullman	Spokane	1975	4,498
"	"	1976	3,587
"	"	1977	4,733
"	"	1978	4,926
"	"	1979	6,771
Yakima	Spokane	1975	4,575
"	"	1977	5,123
"	"	1978	5,469
"	"	1979	5,995
Bloomington	Indianapolis	1975	3,303
"	"	1976	4,376
"	"	1977	6,229
"	"	1978	6,840
"	"	1979	6,706

(continued)

Origin	Destination	Year	Traffic
Terre Haute	Indianapolis	1975	7,097
"	"	1976	7,490
"	"	1978	9,607
"	"	1979	10,594
Muncie	Indianpolis	1975	1,924
"	"	1976	1,595
"	"	1977	3,440
"	"	1978	6,828
Augusta	Boston	1977	28,059
"	"	1978	27,537
"	"	1979	26,930
Hyannis	Boston	1977	39,467
"	"	1978	42,838
"	"	1979	39,368
Lebanon	Boston	1977	35,267
"	"	1978	47,775
"	"	1979	40,064
Montpelier	Boston	1977	11,767
"	"	1978	8,596
"	"	1979	5,147
Portland	Boston	1977	25,544
"	"	1978	22,913
"	"	1979	15,366

Source: CAB data

APPENDIX D

AIRCRAFT INVENTORY AND OAG SCHEDULED OPERATIONS BY AIRCRAFT CODES

AIRCRAFT INVENTORY AND SCHEDULED OPERATIONS   8:38 TUESDAY, MAY 26, 1981   1

OBS	EQUIP	NAME	MINSEATS	MAXSEATS	PAYLOAD	PLANE75	SCHOPS75	PLANE76	SCHOPS76	PLANE77	SCHOPS77	PLANE78	SCHOPS78	PLANE79	SCHOPS79
1	ACD	AERO COMMANDER	5	7	2750	14	.	27	.	30	.	36	.	45	10972
2	AC5	AERO	10	.	.	0	.	0	.	0	2028	0	.	0	.
3	AC6	AERO	5	7	2850	0	.	0	.	0	3328	0	.	0	.
4	A50	NOT ASSIGNED	.	.	.	.	.	.	962	.	.	.	.	.	.
5	BBR	NOT ASSIGNED	.	.	.	.	.	.	7358	.	.	.	.	.	.
6	BEB	BEECH BARON	4	6	1965	11	.	21	.	6	.	24	.	39	6084
7	BEC	BEECHCRAFT	10	.	.	0	.	0	.	0	.	0	.	0	3588
8	BEC23	BEECH C-23	3	.	.	0	.	0	.	0	.	0	.	2	.
9	BEE	BEECH B-90	10	.	.	0	.	90	.	0	.	0	.	1	.
10	BEO	BEECHCRAFT TWIN BONANZA	5	.	2230	4	.	4	.	4	.	7	.	2	2522
11	BEQ	BEECH QUEEN AIR 80	7	11	3578	0	.	5	.	3	.	5	.	14	37726
12	BET	BEECHCRAFT	8	.	.	0	.	0	.	0	.	0	.	0	82160
13	BE1	BEECH B-18 CONVERSION	11	15	4055	149	.	194	.	140	.	91	.	106	34918
14	BE100	BEECH BE100	10	.	.	0	.	0	.	2	.	1	.	0	.
15	BE2	TWIN BEECH 18	6	9	2980	0	.	0	.	0	.	0	.	0	34580
16	BE24	BEECH B-24	3	.	.	1	.	0	.	0	.	0	.	0	.
17	BE9	BEECH 99	8	17	5123	98	.	83	.	95	.	95	.	106	518440
18	BGL	NOT ASSIGNED	10	.	.	0	.	0	.	0	.	0	6240	0	.
19	BH2	BELL 206A JET RANGER HELICOPTE	5	.	860	0	.	2	.	3	140348	2	.	1	.
20	BH4	NOT ASSIGNED	10	.	.	0	.	0	.	0	13000	0	.	0	.
21	BNI	NOT ASSIGNED	10	.	.	0	.	0	.	0	.	0	.	0	218101
22	BNT	BRITTEN NORMAN TRISLANDER	18	.	.	38	.	29	.	29	.	34	.	38	.
23	BTP	NOT ASSIGNED	.	.	.	.	.	.	54977	.	.	.	.	.	.
24	B18	BE1	11	15	4055	0	.	0	78182	0	.	0	.	0	.

AIRCRAFT INVENTORY AND SCHEDULED OPERATIONS   8:38 TUESDAY, MAY 26, 1981

OBS	EQUIP	NAME	MINSEATS	MAXSEATS	PAYLOAD	PLANE75	SCHOPS75	PLANE76	SCHOPS76	PLANE77	SCHOPS77	PLANE78	SCHOPS78	PLANE79	SCHOPS79
25	B72	BOEING 720	92	144	32000	0	.	0	.	0	.	0	.	0	78
26	B80	BEQ	7	11	3578	0	.	0	18538	0	.	0	.	0	.
27	B99	BE9	8	17	5123	0	.	0	275587	0	.	0	.	0	.
28	CES	CNT	4	7	1729	0	.	0	52806	0	.	0	.	0	.
29	CNA	CESSNA	10	.	.	0	.	0	.	0	.	0	.	0	121082
30	CNT	CESSNA 207 TURBO SYSTEM	4	7	1729	36	.	36	.	54	.	49	.	33	32942
31	CN1	CESSNA C-150	1	.	.	0	.	0	.	0	.	0	.	2	.
32	CN2	CESSNA 206	4	7	1792	42	.	50	.	38	.	34	.	40	26156
33	CN4	CESSNA 402 TWIN TURBO SYSTEM	4	8	2436	85	.	93	.	102	.	143	.	157	505635
34	CVR	CONVAIR	56	.	11200	0	.	2	.	0	.	1	.	16	20540
35	CVT	CONVAIR CV-340/440	44	52	.	12	.	9	.	10	.	7	.	10	1040
36	CV2	NOT ASSIGNED	.	.	.	.	3536	.	.	.	.	.	.	.	.
37	CV4	NOT ASSIGNED	60	.	.	0	.	0	.	0	.	0	.	0	4966
38	CV5	NOT ASSIGNED	60	.	.	0	.	0	.	0	.	0	.	0	23478
39	CV6	CONVAIR 640	40	.	15800	0	.	0	.	0	.	0	.	5	1248
40	CWC	CURTISS WRIGHT COMMANDO C46	0	60	12000	1	.	4	.	7	.	4	.	4	4394
41	C46	NOT ASSIGNED	.	.	.	.	.	.	2340	.	.	.	.	.	.
42	C500	CESSNA C-500	7	10	.	1	.	0	.	0	.	5	.	1	.
43	DAF	NOT ASSIGNED	70	.	.	0	.	0	.	0	129864	0	.	0	.
44	DC3	MCDONNELL DOUGLAS DC3/DAKOTA C	19	30	7380	60	.	42	.	83	.	68	.	44	88400
45	DC4	MCDONNELL DOUGLAS DC4/SKYMASTE	0	80	11440	0	.	0	.	0	.	2	.	7	9256
46	DC6	MCDONNELL DOUGLAS DC6	0	80	12310	2	.	2	.	2	.	1	.	0	962
47	DC9	MCDONNELL DOUGLAS DC9-10 AND 2	72	90	20850	0	.	0	.	0	.	0	.	0	520
48	DDV	DHD	8	11	.	0	.	0	13936	0	.	0	.	0	.

AIRCRAFT INVENTORY AND SCHEDULED OPERATIONS 8:38 TUESDAY, MAY 26, 1981

OBS	EQUIP	NAME	MINSEATS	MAXSEATS	PAYLOAD	PLANE75	SCHOPS75	PLANE76	SCHOPS76	PLANE77	SCHOPS77	PLANE78	SCHOPS78	PLANE79	SCHOPS79
49	DESF	DESAULT FALCON	7	9	.	0	.	29	.	29	.	21	.	0	.
50	DHB	DE HAVILLAND CANADA BEAVER	10	.	1800	10	.	8	.	11	.	10	.	13	.
51	DHC	DE HAVILLAND COMET-4 JET	101	.	22900	0	.	0	3276	0	.	0	.	0	.
52	DHD	DE HAVILLAND CAMADA DOVE	8	11	.	2	.	3	.	3	.	14	.	9	2392
53	DHH	DE HAVILLAND HERON	14	17	.	35	.	35	.	33	.	4	.	3	197912
54	DHK	DE HAVILLAND DHC-4 CARIBOI	32	.	8740	0	.	0	1820	0	.	0	.	0	.
55	DHO	DE HAVILLAND CANADA OTTER	10	.	.	1	.	2	.	1	.	2	.	23	6266
56	DHR	DE HAVILAND RILEY 400	14	17	.	0	.	0	.	0	.	0	.	0	7774
57	DHS	NOT ASSIGNED	.	.	.	.	.	.	.	.	2680	.	.	.	.
58	DHT	DE HAVILLAND CANADA TWIN OTTER	19	.	4420	0	.	0	.	0	.	0	.	0	661596
59	DH6	DE HAVILLAND CANADA DHC-6-300	19	.	4430	59	.	50	.	81	.	85	.	75	15834
60	DH7	DE HAVILLAND CANADA DHC-7	50	.	15000	0	.	0	.	0	.	1	.	0	37752
61	DO28A	DORNIER DO-28A	12	.	.	0	.	0	.	0	.	2	.	0	.
62	DTO	NOT ASSIGNED	.	.	.	.	.	.	397709	.	.	.	.	.	.
63	EMB	EMBREAR BANDEIRANTE	18	.	5000	0	.	0	.	0	.	0	.	4	30030
64	EVAN	EVANGEL 4500-300	8	.	.	0	.	0	.	0	.	1	.	0	.
65	FH7	FK7	40	48	11500	0	.	0	15236	0	.	0	.	0	.
66	FKF	FH/FOKKER FRIENDSHIP	40	48	12000	0	.	0	.	0	.	0	.	0	1976
67	FK7	FAIRCHIL-HILLER FH227	40	48	11500	0	.	0	.	0	.	0	.	0	37804
68	FORD	FORD 4ATB TRIMOTOR	5	.	.	0	.	1	.	2	.	0	.	0	.
69	F27	FK7	40	48	11500	0	5096	0	.	0	.	0	.	0	.
70	GGM	GRM	10	15	1950	0	.	0	3562	0	.	0	.	0	.
71	GGS	GRO	10	.	2000	0	.	0	80002	0	.	0	.	0	.
72	GRG	GRUMMAN G-21A GOOSE	10	.	2000	27	.	25	.	19	.	16	.	6	42848

OBS	EQUIP	NAME	MINSEATS	MAXSEATS	PAYLOAD	PLANE75	SCHOPS75	PLANE76	SCHOPS76	PLANE77	SCHOPS77	PLANE78	SCHOPS78	PLANE79	SCHOPS79
73	GRM	GRUMMAN MALLARD	10	15	1950	2	.	7	.	7	.	9	.	13	44798
74	GRS	GRUMMAN GULFSTREAM 1-G-159	18	24	7500	0	.	0	.	0	.	1	.	2	13130
75	GRT	GRUMMAN TIGER	4	.	1100	0	.	0	.	0	.	0	.	0	1820
76	GWIDG	GRUMMAN WIDGEON	5	.	.	11	.	0	.	0	.	0	.	0	.
77	G206	GRUMMAN G-206	8	.	.	0	.	0	.	0	.	0	.	2	.
78	HFB320	HANSA HFB-320	6	11	.	0	.	0	.	0	.	5	.	0	.
79	HFH	NOT ASSIGNED	.	.	.	.	.	.	312	.	.	.	.	.	.
80	HPJ	HANDLEY PAGE JET STREAM	14	18	4100	4	.	7	.	10	.	8	.	17	93704
81	HRN	NOT ASSIGNED	.	.	.	.	.	.	159796	.	.	.	.	.	.
82	HS7	HAWKER SIDDELEY 748	40	56	11363	0	.	0	.	0	.	1	4290	0	.
83	H250	HELIO COURIER H-250	5	.	.	1	.	2	.	0	.	1	.	2	.
84	H295	HELIO H-295	5	.	.	0	.	0	.	0	.	2	.	0	.
85	JRH	NOT ASSIGNED	.	.	.	.	.	.	4940	.	.	.	.	.	.
86	LANCE	LANCE	5	.	.	0	.	0	.	0	.	1	.	0	.
87	LJT	NOT ASSIGNED	.	.	.	.	.	.	9204	.	.	.	.	.	.
88	LOE	LOCKHEED ELECTRA TURBOPROP	66	104	22000	0	.	0	.	0	.	0	.	0	78
89	LRJ	LEARJET	5	7	.	6	.	0	.	1	.	5	.	4	2600
90	L10A	LOCKHEED 10A	0	.	.	1	.	1	.	1	.	0	.	0	.
91	L188	LOCKHEED L-188	85	.	.	0	.	0	.	0	.	1	.	0	.
92	MO2	MOONEY MARK 20A	12	.	.	0	.	0	.	1	.	0	.	0	2262
93	MR4	MARTIN 404	44	.	9500	7	.	9	.	10	.	18	.	24	35230
94	MU2	NOT ASSIGNED	.	.	.	.	.	.	3146	.	.	.	.	.	.
95	MU2J	MITSUBISI MU-2J	6	11	.	0	.	0	.	0	.	1	.	0	.
96	M20	MO2	12	.	.	0	.	0	93496	0	.	0	.	0	.

OBS	EQUIP	NAME	MINSEATS	MAXSEATS	PAYLOAD	PLANE75	SCHOPS75	PLANE76	SCHOPS76	PLANE77	SCHOPS77	PLANE78	SCHOPS78	PLANE79	SCHOPS79
97	NDN	AEROSPATIALE DAUPHIN 360	14	.	.	0	.	0	.	0	.	0	.	0	15860
98	ND2	NORD 262	27	.	5810	7	.	12	.	16	.	18	.	13	73554
99	N26	NOT ASSIGNED	.	.	.	.	.	.	17914	.	.	.	.	.	.
100	PAA	NOT ASSIGNED	8	.	.	0	.	0	.	0	.	0	.	0	520
101	PAC	PIPER CHEROKEE	6	7	1544	45	.	47	.	61	.	72	.	73	79430
102	PAF	PIPER CHIEFTAIN	8	.	.	0	.	0	.	0	.	0	.	0	239850
103	PAG	NOT ASSIGNED	7	.	.	0	.	0	.	0	.	0	.	0	20228
104	PAN	PIPER NAVAJO	6	8	2796	64	.	83	.	125	.	160	.	200	513461
105	PAS	PIPER SENECA	6	7	1747	0	.	0	.	0	.	0	.	0	58162
106	PAT	NOT ASSIGNED	10	.	.	0	.	0	.	0	.	0	.	0	1040
107	PAZ	PIPER AZTEC	6	.	2151	46	.	42	.	51	.	55	.	57	36816
108	PA14	PIPER PA-14	3	.	.	0	.	0	.	1	.	0	.	0	.
109	PA18	PIPER PA-18	1	.	.	2	.	4	.	3	.	2	.	2	.
110	PA24	PIPER PA-24	3	5	.	1	.	4	.	0	.	3	.	2	.
111	PA26	PIPER PA-26	3	.	.	0	.	0	.	0	.	1	.	0	.
112	PA30	PIPER PA-30	3	5	.	6	.	2	.	3	.	4	.	0	.
113	PCB	NOT ASSIGNED	.	.	.	.	.	.	35802	.	.	.	.	.	.
114	PCH	PAC	6	7	1544	0	.	0	18356	0	.	0	.	0	.
115	PDS	NOT ASSIGNED	.	.	.	.	.	.	10062	.	.	.	.	.	.
116	PHP	NOT ASSIGNED	.	.	.	.	.	.	19578	.	.	.	.	.	.
117	PNV	PAN	6	8	2796	0	.	0	208832	0	.	0	.	0	.
118	PPS	PL6	.	.	.	0	.	0	27326	0	.	0	.	0	.
119	PRP	NOT ASSIGNED	10	.	.	0	.	0	.	0	.	0	22256	0	.
120	PR4	NOT ASSIGNED	.	.	.	.	.	.	6786	.	.	.	.	.	.

AIRCRAFT INVENTORY AND SCHEDULED OPERATIONS 8:38 TUESDAY, MAY 26, 1981 6

OBS	EQUIP	NAME	MINSEATS	MAXSEATS	PAYLOAD	PLANE75	SCHOPS75	PLANE76	SCHOPS76	PLANE77	SCHOPS77	PLANE78	SCHOPS78	PLANE79	SCHOPS79
121	PTC	NOT ASSIGNED	.	.	.	.	.	.	6318	.	.	.	.	.	.
122	SA2	SAUNDERS ST-27-ST2 (PROP)	23	.	.	0	.	0	.	0	.	0	5408	0	.
123	SHP	SHORT BROS AND HARLAND SKYVAN	19	24	.	10	.	9	.	12	6656	11	.	4	.
124	SHS	NOT ASSIGNED	9	.	.	0	.	0	.	0	.	0	10244	0	.
125	SH3	SHORT BROS. AND HARLAND SD3-30	30	.	7500	0	.	0	.	0	.	0	.	9	74542
126	SKV	NOT ASSIGNED	.	.	.	.	.	.	19526	.	.	.	.	.	.
127	SK5	SIKORSKY S-58 HELICOPTER	12	.	4000	0	.	0	.	0	.	0	.	0	3198
128	SK6	SIKORSKY S-61 HELICOPTER	10	28	6000	0	.	0	.	0	.	0	84318	0	.
129	SR10E	STINSON BUSHMAN SR10E	3	.	.	2	.	1	.	1	.	0	.	0	.
130	SWM	SWEARINGEN METRO	15	19	3950	14	.	16	.	23	.	35	.	38	483912
131	S55	NOT ASSIGNED	.	.	.	.	.	.	27794	.	.	.	.	.	.
132	S62	SIKORSKY S-62 HELICOPTER	10	.	.	0	.	0	.	0	15288	0	.	0	.
133	TB8	NOT ASSIGNED	.	.	.	.	.	.	6292	.	.	.	.	.	.
134	TS4	NOT ASSIGNED	.	.	.	.	.	.	4004	.	.	.	.	.	.
135	TS6	TED SMITH AREOSTAR 601	30	.	.	1	.	2	.	0	.	14	.	6	1378
136	VOF	NOT ASSIGNED	10	.	.	0	.	0	.	0	.	0	520	0	.
137	298	NORD 298 (MOHAWK 298)	25	.	5810	0	.	0	.	0	.	0	.	8	.
138	402	CN4	4	8	2436	0	.	0	274482	0	.	0	.	0	.
139	47J	NOT ASSIGNED	.	.	.	.	24778	.	.	.	.	.	.	.	.
140	601	TS6	30	.	.	0	.	0	3250	0	.	0	.	0	.
141	70F	BOEING 707 FREIGHTER	0	0	83447	0	.	0	.	0	.	6	.	1	.
142	707	BOEING 707 PASSENGER JET	100	159	52000	0	.	0	.	0	.	0	.	0	260
143	737	BOEING 737 PASSENGER JET	101	.	29893	0	.	0	.	0	.	0	.	0	1092

N=143

U.S. GOVERNMENT PRINTING OFFICE: 1981-341-428/1305

END

DATE

FILMED

10-81

DTIC